

Management Plan

for the

NSW Shark Meshing

(Bather Protection) Program

July 2017



New South Wales
Government

Published by NSW Department of Primary Industries

Title: *Management Plan for the NSW Shark Meshing (Bather Protection) Program. July 2017.*

ISBN 978 0 7347 1983 6

Second edition. First published in August 2009.

RM8 reference: PUB17/344

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DEFINITIONS

In this Plan:

“**Animal**” means any animal-life (other than human), whether vertebrate or invertebrate and in any stage of biological development, and includes a dead animal.

“**Compliance Plan**” means a strategic operational plan that seeks to optimise Contractor compliance with this Plan.

“**Contract**” means a contract for the provision of Services by a third party to set and inspect nets in the NSW Shark Meshing (Bather Protection) Program.

“**Contractor**” means the organisation which by the Contractor undertakes to provide the services required by the Contract and, where the Contractor is an individual or a partnership, the expression shall include the personal representatives of that individual or of the partners as the case may be and the expression shall also include any person to whom the benefit of the Contract may be assigned by the Contractor with the consent of DPI.

“**CPUE**” means catch per unit of effort (e.g. sharks caught per 1000 net settings).

“**DPI**” means the NSW Department of Primary Industries.

“**Fish**” has the same meaning as in section 5 of the *Fisheries Management Act 1994*.

“**Fisheries Scientific Committee**” means the Fisheries Scientific Committee established under section 221ZA of the *Fisheries Management Act 1994*.

“**Inspection**” means a Contractor checking a Net to set, run, haul and set, or haul a Net.

“**JMA**” means the Joint Management Agreement for the NSW Shark Meshing (Bather Protection) Program made under Part 7A Division 8 of the *Fisheries Management Act 1994* and Part 7 Division 2 of the *Threatened Species Conservation Act 1995*.

“**Marine Birds**” means animals of the orders of Procellariiformes, Pelecaniformes and Falconiformes, and animals of the family Laridae and Stercorariidae.

“**Marine Mammals**” means all animals of the orders of Cetacea, Sirenia and Pinnipedia.

“**Marine Reptiles**” means animals of the family Cheloniidae and Dermochelyidae.

“**Marine Vegetation**” has the same meaning as in the *Fisheries Management Act 1994*.

“**Meshing season**” means the period from 1 September until and including 30 April of the next consecutive calendar year.

“**Nets**” means bottom-set synthetic filament mesh nets, 150m in length, with 60cm mesh size and 6m in depth, set in a generally parallel direction off the beach, anchored in approximately 10m depth of water (not more than 12m depth) with a weighted bottom line (leadline) and a floated top line (floatline). The Nets are identified by surface floats.

“**Non-Target Species**” means all vertebrate species that are not Target Sharks.

“**Observer**” means a person engaged by DPI to carry out observations of Contractors performing the Services of the Contract.

“**Observer Program**” means the provision of employees to monitor SMP operations to quantify and maximise the accuracy of information arising from captures.

“**OEH**” means the Office of Environment and Heritage.

“**Parties to the Agreement**” means the Minister for Primary Industries and the Chief Executive of the Office of Environment and Heritage.

“**Protected Fauna**” has the same meaning as in the *National Parks and Wildlife Act 1974*.

“**Protected Fish**” means species of fish listed in Part 1 of the Table to clause 5 and Part 1 of the Table to clause 6 of the *Fisheries Management (General) Regulation 2010*.

“**Scientific Committee**” means the Scientific Committee established under section 128 of the *Threatened Species Conservation Act 1995*.

“**Services**” means, without limiting the generality of the expression, advisings (other than legal advisings), consultancies, installations and the performance of professional or trade operations of any kind.

“**Shark Scientist**” means the officer appointed to this position by DPI.

“**Shark Meshing**” means the placing of Nets at the 51 beaches listed in Table 1 of this Plan to protect the public from Target Sharks.

“**SMP**” means the NSW Shark Meshing (Bather Protection) Program.

“**Sub-Contractor**” means a person who furnishes equipment or services to a Contractor operating in the SMP, either directly or through another sub-Contractor for use under a Contract.

“**Shark Meshing Supervisor**” means the officer appointed to this position by DPI to oversee Contractors.

“**Target Sharks**” means White Shark (*Carcharodon carcharias*), Tiger Shark (*Galeocerdo cuvier*) and Bull Shark (*Carcharhinus leucas*).

“**this Plan**” means this document titled “*Management Plan for the NSW Shark Meshing (Bather Protection) Program*”.

“**Threatened Species**” has the same meaning as in the *Fisheries Management Act 1994* and as in the *Threatened Species Conservation Act 1995*.

“**Threatened Species Scientific Committee**” means the Threatened Species Scientific Committee established under the *Environment Protection and Biodiversity Conservation Act 1999*.

“**Threatened Species, Populations and Ecological Communities** and **Threatened Species, Population or Ecological Community**” have the same meanings as in the *Fisheries Management Act 1994* and as in the *Threatened Species Conservation Act 1995*.

“**VMS**” means a Vessel Monitoring System.

PART 1 INTRODUCTION

1 Name of plan

- 1.1 This plan is the Management Plan for the NSW Shark Meshing (Bather Protection) Program, July 2017 (hereinafter “this Plan”).

2 Date of commencement

- 2.1 This Plan comes into force on 1 September 2017.

3 Definition of the activity

- 3.1 The activity of shark meshing is defined herein as the placing of nets at the 51 beaches listed in Table 1 of this Plan to protect the public from target sharks.
- 3.2 The activity is formally undertaken in NSW through the SMP. In general terms the SMP is a fishing activity comprising the placing of nets at 51 beaches between Stockton and South Wollongong to protect the public from sharks.
- 3.3 The SMP uses bottom-set synthetic filament mesh nets 150m in length and 6m in depth of 60cm mesh size that are set in a generally parallel direction off the beach, anchored in approximately 10m depth of water. The nets have a weighted bottom line (leadline) and a floated top line (floatline) and are identified by surface floats.
- 3.4 The SMP includes all activities by Contractors who own, maintain, set, run and haul the nets in accordance with the Services as defined in the Contract.
- 3.5 The SMP also includes all activities by DPI associated with contract administration, compliance, supervision, observer programs, research programs, monitoring, and reporting.

4 Authority for the activity

- 4.1 Shark meshing activities carried out at the 51 beaches listed in Table 1 of this Plan and undertaken in accordance with the JMA and this Plan are authorised by JMA under the *Threatened Species Conservation Act 1995* and the *Fisheries Management Act 1994*.
- 4.2 Shark meshing activities are also undertaken in accordance with general provisions of the *Fisheries Management Act 1994* and the *Fisheries Management (General) Regulation 2010*.

5 Legislative context

- 5.1 Harming Threatened Species is an offence under the *National Parks and Wildlife Act 1974* and the *Fisheries Management Act 1994*. Activities authorised by, and done in accordance with, a JMA entered into under Part 7 of the *Threatened Species Conservation Act 1995* or Part 7A of the *Fisheries Management Act 1994* respectively, provide a defence to prosecution for Threatened Species offences.
- 5.2 Harming Protected Fauna is an offence under the *National Parks and Wildlife Act 1974*. Activities authorised by, and done in accordance with, a JMA entered into under Part 7 of the *Threatened Species Conservation Act 1995* provide a defence to prosecution for Protected Fauna offences.
- 5.3 Taking or possessing Protected Fish is an offence under the *Fisheries Management Act 1994*. Activities authorised by, and done in accordance with, a JMA entered into under Part 7A of the *Fisheries Management Act 1994* provide a defence to prosecution for Protected Fish offences.

- 5.4 *Death or injury to marine species following capture in shark control programs on ocean beaches* is a key threatening process in the *Threatened Species Conservation Act 1995*.
- 5.5 *The current shark meshing program in New South Wales waters* is a key threatening process in the *Fisheries Management Act 1994*.
- 5.6 OEH and DPI are required to develop strategies for managing each key threatening process. These strategies are set out in Priorities Action Statements prepared under Part 5A of the *Threatened Species Conservation Act 1995* and Part 7A of the *Fisheries Management Act 1994*.

6 Proponent of the activity

- 6.1 The SMP is authorised by DPI and OEH through the JMA. The SMP is managed by DPI on behalf of the NSW Government. Meshing operations are conducted by Contractors.
- 6.2 For the purposes of this Plan, the proponent of the activity is taken to mean DPI.

7 Relationship to the *Environmental Planning and Assessment Act 1979*

- 7.1 For the avoidance of doubt, and in accordance with s.115RA of the *Environmental Planning and Assessment Act 1979*, the *Environmental Planning and Assessment Act 1979* does not apply to shark meshing that is the subject of a joint management agreement under the *Threatened Species Conservation Act 1995* and the *Fisheries Management Act 1994*.

8 Environmental assessment

- 8.1 The activity of shark meshing was subject to a review and environmental assessment to inform development of the two Joint Management Agreements in 2009 and the 2009 Management Plan for the SMP.
- 8.2 The management provisions of this Plan (and the 2009 Management Plan) were designed to mitigate the environmental impacts of the activity as far as possible while still achieving the program aim.
- 8.3 The management provisions of this Plan and the 2017 Joint Management Agreement were informed by the recommendations in the *5-Year Review of the August 2009 Joint Management Agreements for the NSW Shark Meshing (Bather Protection) Program* (NSW DPI 2016).

9 Relationship to the *Environment Protection and Biodiversity Conservation Act 1999*

- 9.1 The threatening process '*Death or injury to marine species following capture in beach meshing (nets) and drum lines used in shark control programs*' was nominated for listing as a key threatening process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
- 9.2 The Threatened Species Scientific Committee (TSSC) established under section 205 of the *Environment Protection and Biodiversity Conservation Act 1999* assessed the threatening process against the criteria in section 188(4) of the *Environment Protection and Biodiversity Conservation Act 1999*.
- 9.3 Following the assessment the TSSC recommended that the threatening process was not eligible for inclusion in the list of key threatening processes under section 183 of the *Environment Protection and Biodiversity Conservation Act 1999*.
- 9.4 After considering the TSSC's recommendation and advice the Minister decided that the threatening process was not eligible to be treated as a key threatening process under section 188 of the *Environment Protection and Biodiversity Conservation Act 1999*.

- 9.5 An action that has, will have or is likely to have a significant impact on matters of national environmental significance may need approval under the *Environment Protection and Biodiversity Conservation Act 1999*. Section 43B of the *Environment Protection and Biodiversity Conservation Act 1999* provides that actions that are a lawful continuation of use of the land, sea or seabed that was occurring before 16 July 2000 are not subject to approval under the *Environment Protection and Biodiversity Conservation Act 1999*.
- 9.6 Approval under the *Environment Protection and Biodiversity Conservation Act 1999* for the SMP was not sought in 2009 (when the first Management Plan was enacted) on the basis that the SMP was a lawful continuation of use of the land, sea or seabed and was therefore covered by the continuing use exemption in section 43B of the *Environment Protection and Biodiversity Conservation Act 1999*.

PART 2 AIM, OBJECTIVES, PERFORMANCE INDICATORS & TRIGGER POINTS

10 Program aim

- 10.1 The aim of the SMP is to reduce the chances of shark interactions within the area of operation of the program whilst minimising impacts on non-target species.
- 10.2 The operational means by which the program aim is pursued and continually refined are set out in this Plan.

11 Management Plan objectives

- 11.1 The objectives of this Plan are to:
- 11.1.1 Reduce the risk to humans from shark bites at beaches subject to the SMP, and, consistent with that objective:
- 11.1.2 Minimise the impact on non-target species and to ensure that the SMP 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;
- 11.1.3 Minimise work health and safety risks to Contractors and agency personnel associated with implementing the SMP; and
- 11.1.4 Ensure that monitoring and reporting on the SMP is undertaken in a transparent manner.

12 Performance indicators and trigger points

- 12.1 The following performance indicators are to be used to determine the performance of this Plan in meeting its objectives:
- 12.1.1 Performance Indicator for Objective 11.1.1: *Change in the number of human fatalities or serious injuries from shark bites.*
- Trigger Point: 1 fatality or serious injury per meshing season on a meshed beach.
- Where: Serious injury means injuries from a shark bite that result in a threat to life or limb.
- 12.1.2 Performance Indicator #1 for Objective 11.1.2: *Change in the number of entanglements of threatened species, populations and ecological communities and other non-target species in the SMP.*
- Trigger Point 1: Entanglements of Endangered or Critically Endangered Species, Populations or Ecological Communities in a single meshing season

exceed the annual average catch plus two standard deviations of the preceding 10 years for those species

Trigger Point 2: Entanglements of Vulnerable species or ecological communities in a single meshing season exceed the annual average catch plus three standard deviations of the preceding 10 years for those species

Trigger Point 3: Entanglements of other non-target species over 2 consecutive meshing seasons exceed twice the annual average catch of the preceding 10 years for those species.

12.1.3 Performance Indicator #2 for Objective 11.1.2: *Change in the number or status of threatened species affected by the SMP.*

Trigger Point: The listing of a new species, or a change to the status of an already listed threatened species, population or ecological community under the *Fisheries Management Act 1994* or *Threatened Species Conservation Act 1995* that may be directly and detrimentally affected by Shark Meshing.

12.1.4 Performance Indicator for Objective 11.1.3: *Change in the number of major or minor workplace incidents reported by Contractors or observers.*

Trigger Point: 1 major or 2 minor incidents per meshing season.

Where: Major incidents are workplace incidents that result in 5 or more days lost time.

Where: Minor incidents are workplace incidents that are reportable to NSW WorkCover or are workplace incidents that result in between 2 and 4 days lost time.

12.1.5 Performance Indicator for Objective 11.1.4: *Extent to which the public reporting requirements are met.*

Trigger Point: Annual performance report submitted to the Parties to the Agreement by 31 July each year.

Note: Table 5 details the methods for assessing these performance indicators.

13 Achievement of the objective

13.1 The objectives of this Plan are to be achieved through the implementation of:

13.1.1 Controls on the activity (Part 3);

13.1.2 Observer Program (Part 4);

13.1.3 Compliance Plan (Part 5);

13.1.4 Strategic Research and Monitoring Programs (Part 6); and

13.1.5 Performance assessment and reporting processes (Part 7).

PART 3 CONTROLS ON THE ACTIVITY

Division 1 Contract management

14 Meshing activities to be managed by Contract

14.1 Meshing activities in the SMP are to be undertaken by third party service providers (Contractors) in accordance with legally binding contracts with the Principal (the NSW Department of Industry).

- 14.2 The development of each contract is to be overseen by DPI as a division of the NSW Department of Industry.
- 14.3 The Principal's delegate is the Director General of DPI. The day-to-day functions of the Principal's delegate are sub-delegated to other officers of DPI, including but not limited to observers, the Supervisor, and the Shark Scientist.

15 Subcontractors

- 15.1 Contractors may, in accordance with the Terms of Services of their Contract, engage the services of subcontractors to perform any part of the Services of the Contract.
- 15.2 The Contractor remains fully responsible for the performance of the Services if they subcontract the performance of any part of the Services.
- 15.3 The Contractor must engage any subcontractors under written agreement on terms consistent with their Contract.

16 Contractor's obligations

- 16.1 Contractors are required to comply with all conditions and requirements of their Contract.
- 16.2 Failure to comply with Contract conditions constitutes a breach of Contract.
- 16.3 The Contractor must at all times act in a lawful manner while providing services in the SMP including, without limitation, complying with all taxation legislation, privacy legislation, workers compensation and work health and safety requirements.
- 16.4 In providing the Terms of Services, the Contractor shall also comply with:
- 16.4.1 Any relevant Statutes, Regulations and By-Laws, and any Commonwealth, State, Territory or local authority;
 - 16.4.2 Other legislative requirements; and
 - 16.4.3 The requirement to provide information on any notification of breaches of any legislation (e.g. WorkCover NSW notifications).
- 16.5 The Contractor will provide DPI with information and assistance relating to contract administration and management including, but not restricted to:
- 16.5.1 Timely provision of proposed shark meshing activities;
 - 16.5.2 Details of the log of recorded daily shark meshing operations, including use of VMS;
 - 16.5.3 Make Nets available for examination and measurement by the Shark Meshing Supervisor before the start of the Meshing Season, and for examination throughout the Meshing Season;
 - 16.5.4 Timely provision of photographic images;
 - 16.5.5 Biological samples as requested;
 - 16.5.6 Notification of capture or entanglement of any animal;
 - 16.5.7 Environmental management;
 - 16.5.8 Management of employees and industrial relations; and
 - 16.5.9 Compliance with *Work Health and Safety Act 2011* and *Work Health and Safety Regulation 2011* (WHS - administered by WorkCover NSW).
- 16.6 Contractors are required to co-operate with any research or monitoring program authorised by DPI where such activities are described in-writing and provided to the Contractor.

17 Effect of breach of contract

- 17.1 Breach of contract provisions constitute grounds for recoverable actions being instituted by the Principal. These actions include the right to terminate the contract and obtain services elsewhere.

18 Number of Contractors authorised to undertake the activity

- 18.1 A total of one (1) Contractor may operate in each of the seven (7) administrative regions.
- 18.2 The seven (7) administrative regions in the SMP are:
- 18.2.1 Hunter
 - 18.2.2 Central Coast North
 - 18.2.3 Central Coast South
 - 18.2.4 Sydney North
 - 18.2.5 Sydney Central
 - 18.2.6 Sydney South
 - 18.2.7 Illawarra
- 18.3 Each Contractor may have assistants (deckhands) and each vessel will be allocated an Observer to accompany the operation for a percentage of meshing operations.
- 18.4 Whilst the Contractor is engaged in shark meshing operations, no persons will be permitted to be on board the vessel other than normal crew members, the Observer or any other person authorised by the Shark Meshing Supervisor.

Division 2 Restrictions on timing, waters, gear and methods

19 Timing

- 19.1 The timing of the SMP is subject to the following controls:
- 19.1.1 Meshing activities undertaken as part of the SMP may only occur in the period from 1 September until and including 30 April of the next consecutive calendar year.
 - 19.1.2 During the meshing season the Nets must be set in accordance with Contract requirements and all applicable controls established by this Plan.
 - 19.1.3 Despite clause 19.1.1, the Nets may be set by Contractors up to 2 days before 1 September or retrieved up to 2 days after 30 April for those seasons commencing or concluding on a weekend. This variation is limited to seasons commencing on a weekend and seasons concluding on a weekend for the 5 year period prior to review of this Plan.
- 19.2 Where OEH is of the opinion that the location and behaviour of an individual or group of individuals belonging to the family Balaenidae, Balaenopteridae or Dugongidae places it at risk of entanglement, OEH may make a request to DPI to delay or modify the setting of Nets at specified beaches.
- 19.3 DPI must consider any request made by OEH under clause 19.2 and notify the public of any proposed delays or modifications prior to implementing any change. Public notification is to take the form of temporary signage at affected beaches for the duration of the delay or modification.

20 Beaches to which the SMP and this Plan applies

- 20.1 The SMP currently operates across the 7 regions identified in clause 18.2 and at 51 beaches from Stockton Beach to South Wollongong Beach as specified in Table 1.

20.2 The number of administrative regions and their boundaries may change during the life of this Plan.

Table 1. The seven administrative regions and 51 meshed beaches of the SMP

Hunter	Central Coast North	Central Coast South	Sydney North
1. Stockton	8. Blacksmiths	15. Terrigal	22. Palm Beach
2. Nobbys	9. Caves Beach	16. North Avoca	23. Whale Beach
3. Newcastle	10. Catherine Hill Bay	17. Avoca	24. Avalon Beach
4. Bar Beach	11. Lakes	18. Copacabana	25. Bilgola Beach
5. Dixon Park	12. Soldiers	19. MacMasters	26. Newport
6. Merewether	13. The Entrance	20. Killcare	27. Mona Vale
7. Redhead	14. Shelly Beach	21. Umina	28. Warriewood
Sydney Central	Sydney South	Illawarra	
29. North Narrabeen	37. Bondi Beach	45. Wattamolla	
30. Narrabeen	38. Bronte	46. Garie	
31. Dee Why	39. Coogee	47. Coledale	
32. Curl Curl	40. Maroubra	48. Austinmer	
33. Freshwater	41. Wanda	49. Thirroul	
34. Queenscliff	42. Elouera	50. North Wollongong	
35. North Steyne	43. North Cronulla	51. South Wollongong	
36. Manly	44. Cronulla		

21 Fishing gear specifications

21.1 Fishing gear used in the SMP must comply with specifications regulated by the *Fisheries Management (General) Regulation 2010* as summarised in Table 2.

21.2 Standardised mesh size of 60cm is to be used by all Contractors in the SMP.

Table 2. Fishing gear specifications in the SMP

Gear/item	Specification
Floatline	150m of not less than 8mm diameter, synthetic rope with a breaking strain of not less than 900kg.
Leadline	150m of not less than 8mm diameter, synthetic rope with a breaking strain of not less than 900kg.
Buoys/Floats	Gill net buoys/floats of not less than 10cm in diameter and not less than 5cm thickness, or a float of equivalent buoyancy approved by DPI and spaced not more than 5m centres.
Netting twine	Continuous synthetic filament with a breaking strain of not less than 60kg.
Mesh size ¹	Mesh size must be 60cm.
Mesh depth	The number of meshes must not be less than 12 meshes deep so that the height is approximately 6m when set.
Hanging coefficient (floatline & leadline)	0.67 (33% slack hung), i.e. each 60m of net is hung into 40m of floatline or leadline.
Hanging coefficient (sidelines)	0.74 of the product of the mesh size and number of meshes deep of the net used.
Side rope length	5.33m (60cm mesh * 12 meshes deep)
Bridle	The bridle from each net to the anchors shall have sufficient slack to fish to its maximum depth.
Identification	Nets must be: <ul style="list-style-type: none"> tagged at the surface with a minimum of 20cm diameter yellow floats and clearly marked in black letters "Shark Net"; identified by having securely attached, at or above water level, a tag with dimensions of at least 80mm by 25mm on which are legibly and durably displayed in capital letters the Contractor's name.

Note 1: To measure the mesh size, the net is to be soaked in water for not less than 5 minutes, then stretched out and the distance between the inside edges of the knots measured using a steel rule certified in accordance with the *Trade Measurements Act 1989*. The length of Nets is to be measured in accordance with clause 57(1) of the *NSW Fisheries Management (General) Regulation 2010*.

22 Methods of use

- 22.1 For the purposes of this Plan and as detailed in the Contracts, the methods of Net Inspections are limited to 'set', 'haul' and 'run', or combinations thereof, where:
- 22.1.1 'Set' means to place a Net in the water at a beach specified in Table 1.
- 22.1.2 'Haul' means a Net that is already Set, has been in the water for a minimum of 12 hours between 4pm on one day and sunrise the following day, and is then removed from the water and back into the Contractor's vessel.
- 22.1.3 'Run' means a Net that is already Set, has been in the water for a minimum of 12 hours between 4pm on one day and sunrise the following day, is checked by lifting the entire headline progressively from the water sufficiently to ascertain if any sharks or non-target species are caught, and the Net is then cleared and returned to the water in a continuous operation from end to end.
- 22.2 The Nets are considered to be passive fishing gear, and baits or lures are not to be used for the purpose of attracting sharks.
- 22.3 The position and method of setting nets, and the procedure in all matters affecting the meshing operations is subject to the direction of the Shark Meshing Supervisor, who may also decide whether an Inspection is counted as such for the purposes of the SMP and compliance with the Contract.
- 22.4 Contractors are to advise the Shark Meshing Supervisor if Nets are lost, stolen or damaged, and are to also advise Surf Life Saving NSW of any lost Nets.

23 Frequency of use

- 23.1 The number of Inspections will be calculated on the basis of the number of times a single net, 150 metres in length, is Set or Run or Hauled and Set, or Hauled on any day.
- 23.2 The Nets must be Inspected on 104 occasions over the Meshing Season, comprised of 12 Inspections in eight 4-week periods and eight Inspections in one 3-week period.
- 23.3 Weather conditions permitting, Nets must be Inspected no earlier than 12 hours and within 72 hours of the previous Inspection.
- 23.4 During each Inspection, the Contractor must remove all catch and debris from the Nets.
- 23.5 Nets must be Set on the first day of the Meshing Season and the Nets must be Hauled on the last day of the Season.
- 23.6 On Seasons commencing or concluding on a weekend, the Nets may be Set up to two days before the start of the Season, or Hauled up to two days after the Season.
- 23.7 Nets must not be Set more than 500m offshore (measured to the nearest land), nor in water greater than 12m deep, and/or must be Set at a position determined by the Shark Meshing Supervisor or the Observer.
- 23.8 Only one Net may be set at a time on any one beach on any one day unless authorised by the Shark Meshing Supervisor or the JMA.
- 23.9 Nets may be removed from beaches in the event of extreme weather conditions or as otherwise required following approval by the Shark Meshing Supervisor.

24 Vessels

- 24.1 Contractors are to nominate a vessel to be used in the SMP. The Contractor is required to use the nominated vessel in the performance of the Services under the Contract unless the Contractor has obtained prior written notification from the Shark Meshing Supervisor to use any other vessel.
- 24.2 The nominated vessel may be complemented by a dinghy or tender as an ancillary vessel to the nominated vessel.

- 24.3 The nominated vessel may be used for non-Contract uses once the vessel has returned to port and that the other uses do not impact on the performance of the Contract.
- 24.4 The nominated vessel must be appropriately certified by the Australian Maritime Safety Authority (AMSA) and meet all requirements of the *Marine Safety (Domestic Commercial Vessels) National Law Act 2012* and its *Regulations*.
- 24.5 The nominated vessel must have a manning capacity to properly perform the Services of the Contract and that reflects the core complement plus: any crew required to operate the Contract; the Observer; and at least one other person. The Contractor's crew must have the necessary skills, experience and expertise to operate the vessel and to undertake the Services of the Contract.
- 24.6 The nominated vessel must have all equipment on board the Vessel at all times that is specified by the *Marine Safety (Domestic Commercial Vessels) National Law Act 2012* and its *Regulations* to cover all crew, the Observer and one other person authorised by the Shark Meshing Supervisor.
- 24.7 The nominated vessel must be capable of safely loading the catch onto the deck and unloading the catch from the deck, and securing and transporting target or non-target species up to three and a half (3.5) metres in length.
- 24.8 The DPI will provide Contractors with a VMS or any other device or technology that monitors the vessel in real time. The VMS or other such monitoring device or technology must be on the vessel and turned on before leaving port to undertake the Services of the Contract on any day. The VMS or other such monitoring device or technology is not to be interfered with in any way that would prevent it from operating effectively, and must be made available for the Shark Meshing Supervisor to remove from the vessel at any time.
- 24.9 The following accommodation must be provided for the Observer on the nominated vessel used in the provision of Services of the Contract:
- 24.9.1 a fully enclosed marine type flushing toilet;
 - 24.9.2 a hand basin with connected running water;
 - 24.9.3 adequate individual cabin seating with provision for writing;
 - 24.9.4 a suitably enclosed changing area.
- 24.10 The nominated vessel must have sufficient refrigerated storage on the Vessel for the storage of specimens (e.g. tissue samples) where required.

Division 3 Environmental protection provisions

25 Cleaning and maintenance

- 25.1 Contractors must keep the Nets in good condition and repair as required to the satisfaction of the Shark Meshing Supervisor. As a minimum, good condition means the Nets are removed from the water, cleaned, checked and fully repaired and/or replaced with a clean Net in good condition at least every 14 days.
- 25.2 The waste management and disposal protocols established in clause 26 of this Plan must be complied with when disposing of waste arising from cleaning and maintenance operations.

Note: Nets are prone to fouling by marine organisms, seaweed, and anthropogenic marine debris. Nets are prone to damage from trawlers, storms and by entangled animals.

26 Waste management and disposal protocols

The following waste management and disposal protocols must be implemented by Contractors to minimise environmental and social impacts of the SMP:

- 26.1 Animals caught under the SMP (including skins, jaws, teeth, carcasses or any other portion thereof) are not allowed to be landed anywhere in New South Wales unless otherwise authorised by this Plan.
- 26.2 Animals caught under the SMP are not allowed to be dumped within 3 nautical miles of the NSW coastline unless otherwise authorised by this Plan. Any breach of this requirement is grounds for termination of a contract.
- 26.3 Carcasses disposed beyond 3 nautical miles of the NSW coastline must be prepared in such a manner to cause the carcass to sink.
- 26.4 The management and disposal of waste matter derived from the meshing operations, including any encrusting organisms, marine algae and anthropogenic marine debris is the responsibility of the Contractor and must be disposed of in accordance with local waste management protocols defined by Roads and Maritime Services or local government.
- 26.5 Contractor vessels must be fitted with toilets and waste holding tanks. Waste holding tanks are to be emptied at pump-out facilities wherever possible.

27 Non-target species by-catch reduction protocols

The following protocols apply to Nets of the SMP to reduce interactions with non-target species:

- 27.1 Nets must not be set during the period from 1 May to 31 August each calendar year, subject to the provisions of clause 19.1.3 of this Plan.
- 27.2 Nets must be deployed as a bottom-set / sunk net. No part of the Net (other than that used for the purposes of marking the gear) shall be on the water surface.
- 27.3 Nets must be fitted with acoustic warning devices (dolphin pingers and whale alarms) and other technology devices (e.g. vessel monitoring systems, data loggers, acoustic listening devices) as specified by the Shark Meshing Supervisor or the Shark Scientist. Any lost or non-functioning devices must be reported to the Shark Meshing Supervisor.
- 27.4 Information resources regarding best-practice techniques for avoiding interactions with threatened and non-target species must be used by Contractors.
- 27.5 Contractors must report any lost, damaged, stolen or over-set gear to the Shark Meshing Supervisor.

28 Release protocols

The following release protocols apply to maximise post-capture survival and to minimise harm to live entrapped marine life by ensuring that Contractors:

- 28.1 Use the information resources prepared by the Department or OEH on species identification and release techniques;
- 28.2 Make all reasonable efforts, whilst adhering to work health and safety requirements, to identify and release live animals with the least possible harm;
- 28.3 Contact and follow the instructions provided by the Shark Meshing Supervisor where:
 - 28.3.1 threatened or protected fish species are entangled (e.g. Grey Nurse Shark, White Shark);
 - 28.3.2 marine mammals, marine reptiles, birds are entangled (e.g. whales, dolphins, turtles);
- 28.4 Tag all live sharks (except Grey Nurse Sharks) prior to release, and all marine reptiles in accordance with approved training and safety controls;
- 28.5 Photograph, prior to release, and collect tissue samples as specified in the Shark Meshing Supervisor or OEH's information resources, or as specified by the Shark Meshing Supervisor.

- 28.6 Co-operate with any research or monitoring program authorised by the Department or authorised under the JMAs and associated Management Plan, where such authority is evidenced in writing and produced to You;
- 28.7 Operate in accordance with the JMA and this Plan

29 Threatened and protected species arrangements

Contractors in the SMP must comply with the following measures for any Protected Fauna, Protected Fish, or Threatened Species that become entangled in the nets:

- 29.1 Immediately identify and attempt to release any living Protected Fauna, Protected Fish, or Threatened Species that has been entangled in a net provided it is safe to attempt to do so.
- 29.2 Immediately contact and follow the instructions provided by the SMP Supervisor, who will also contact the Threatened Species Unit of DPI and the Parks and Wildlife Group Regional Duty Officer of OEH. Contractors must take a photographic image of any Threatened Species, Protected Fish or Protected Fauna taken in a net.
- 29.3 Disentangle, handle, treat and release any living marine mammal, marine bird or marine reptile in accordance with any relevant national or State guidelines where practical and safe to do so.
- 29.4 Retain all carcasses of Protected Fauna, Protected Fish or Threatened Species as requested by Shark Meshing Supervisor or Shark Scientist and deliver them to a local place nominated by the Supervisor or Scientist. All carcasses or material from living or deceased animals shall be covered during transport.
- 29.5 Retain any other material from living or deceased animals including whole individuals or in part as specified by DPI or OEH (e.g. tissue samples);
- 29.6 Record and report all Threatened Species and Protected Fauna and Protected Fish entanglements.

30 Contractor recording and reporting requirements

Contractors must:

- 30.1 Keep a complete log (written or electronic), which will record, at a minimum, the following:
- 30.1.1 daily operations of the Vessel;
 - 30.1.2 number and position of Nets set;
 - 30.1.3 number and Beach of Nets not set;
 - 30.1.4 all catch in the Nets;
 - 30.1.5 details of crew;
 - 30.1.6 any further information as required and specified by the Shark Meshing Supervisor.
- 30.2 Report to the Shark Meshing Supervisor any Net that is not inspected in the required time frame;
- 30.3 Notify by telephone within an hour and Report any Net required to be Set in the Schedule that is not Set for any reason to the Shark Meshing Supervisor, including but not restricted to, any Net that is lost, damaged or stolen;
- 30.4 Notify by telephone within an hour and Report to the Shark Meshing Supervisor where a replacement Net is Set where there was no Net Set;
- 30.5 Must, record the details of the lost Net that were provided to Surf Life Saving New South Wales in the log;

- 30.6 Inform the Shark Meshing Supervisor within an hour of identifying that an animal has been caught in the Net. This should be done in an electronic form specified by the Shark Meshing Supervisor and include the details outlined in Attachment C;
- 30.7 Photograph each animal captured or entrapped in the Nets (image should be of adequate quality to allow reasonable identification and assessment of decomposition (where this applies), and transmit the image electronically within an hour of capture to the Shark Meshing Supervisor;
- 30.8 Record the details of any catch as specified in Attachment C using the technology specified in writing by the Shark Meshing Supervisor;
- 30.9 Be responsible for any costs in implementing the technology relating to the recording the details of catches and the transmission of electronic information;
- 30.10 Permit the Shark Meshing Supervisor, the Shark Meshing Scientist and/or Observer to have access at any time to any records kept by You;
- 30.11 Provide, on the last day of each four week period, to the Shark Meshing Supervisor, a summary report capturing the information in Attachment C and in a format to be agreed with the Shark Meshing Supervisor.

PART 4 OBSERVER PROGRAM

31 Purpose

The purpose of the Observer Program is to qualify the delivery of the services under contract and to quantify certain aspects of the activity including:

- 31.1 Contractor compliance with contract conditions⁺,
- 31.2 Certifying that the observed Inspections meet Contract requirements,
- 31.3 Data and sample collection,
- 31.4 Detailing catch of target and non-target species.

***Note: Other measures to optimise compliance with this Plan are incorporated in clause 37 Compliance Plan.**

32 Provision of observer

- 32.1 DPI will provide an accredited observer under delegated authority from the Director-General of DPI for each SMP region.
- 32.2 The observer must be on board the nominated vessel or dinghy used to inspect the nets during the allocated period.

33 Allocated hours for observer

- 33.1 Each observer shall have a number of allocated hours per week. The number of allocated hours may vary between regions and over time subject to available resources.
- 33.2 Approved allocated hours for each region at the time of preparing this Plan were:
 - 33.2.1 Hunter contract, 7 beaches: 11 hours per week
 - 33.2.2 Central Coast North contract, 7 beaches: 16 hours per week
 - 33.2.3 Central Coast South contract, 7 beaches: 16 hours per week
 - 33.2.4 Sydney North contract, 7 beaches: 11 hours per week
 - 33.2.5 Sydney Central contract, 8 beaches: 16 hours per week
 - 33.2.6 Sydney South contract, 8 beaches: 12 hours per week
 - 33.2.7 Illawarra contract, 7 beaches: 13 hours per week

Note: Approved allocated hours are subject to available funding. This may change over the operational life of this Plan.

34 Duties of observer

- 34.1 Observe the work involved in the setting, hauling or running of Nets to ensure it is undertaken in accordance with all terms and conditions of the Contract and this Plan.
- 34.2 Coordinate and perform the physical collection of biological samples for DNA analysis (or other projects).
- 34.3 Identify shark species taken in Net catches (cross-referencing with ID manual).
- 34.4 Maintain a written logbook and photographic image record of all animals that are caught in the Nets while observers are present.
- 34.5 Record stomach contents of sharks, removal of shark heads and taking samples of shark vertebrae.
- 34.6 Liaise with the Shark Scientist regarding collection of fins and other samples.
- 34.7 Organise for the collection of sampled material for delivery to relevant end-point.
- 34.8 Observe and verify (by initialling the Contractor's log book) the Inspections observed each day against those recorded by the Contractor.
- 34.9 Sign the monthly logbook to certify accuracy of the observed Inspections.
- 34.10 Keep a record of acoustic warning devices (pingers and whale alarms) and any other technology used – identifying the number of devices which are operational/not-functioning, and date of battery replacement (including battery type), and provide that advice to the Shark Scientist.
- 34.11 Undertake other duties as authorised by the Shark Scientist or Shark Meshing Supervisor
- 34.12 The Observer is not to carry out any duties that are the contractual responsibility of the SMP Contractor.

35 Notification and determination of departure times

- 35.1 Contractors must allow, at all times, the Observer and/or any other person authorised by the Shark Meshing Supervisor access to and conveyance on any Vessel used in connection with the Contract, and allow the Observer or other authorised person to collect any animal or any portion of an animal;
- 35.2 Contractors are to give at least 24 hours notice to the Observer of proposed departures of the nominated vessel with the time of departure to be determined by the Contractor;
- 35.3 Contractors must wait until the Observer is on board the Vessel before leaving port;

PART 5 COMPLIANCE PLAN

36 Compliance Plan

- 36.1 An SMP Compliance Plan was developed in 2010 and is updated as required by Fisheries Compliance.
- 36.2 The Compliance Plan established a strategic approach to optimising compliance; including covert surveillance, 'spot checks' and audits to create an effective deterrent to non-compliant activity.
- 36.3 The Compliance Plan was developed using fisheries compliance operations methodology for optimising compliance by maximising voluntary compliance while creating effective deterrence to achieve the optimal level of compliance.

37 Audit and compliance checks

- 37.1 Audits and compliance checks of Contractor's operations may be conducted by authorised officers of DPI at any time during the term of the contract.
- 37.2 DPI may require from the Contractor any information with regard to ongoing compliance with statutory and contractual obligations.
- 37.3 Contractors must permit inspection of the Contractor's (or sub-Contractor's) premises, facilities and documents including, but not limited to operations manuals, procedure statements, correspondence and other relevant administrative records.

PART 6 STRATEGIC RESEARCH AND MONITORING PROGRAM

38 Purpose

- 38.1 The purpose of the Strategic Research and Monitoring Program is to provide information that will lead to continuous improvement in the operation of the SMP and in achieving the objectives of this Plan and should be taken into consideration as complementary with the new NSW Shark Management Strategy announced during the last quarter of 2015 (<http://www.dpi.nsw.gov.au/fisheries/info/sharks/nsw-shark-management-strategy>). The Strategy includes trials of emerging technologies for bather protection, which will inform ongoing evaluation of the SMP.

39 Program components

- 39.1 Research components of the program are described in Table 3, including:
 - 39.1.1 Research topic,
 - 39.1.2 Order of research components,
 - 39.1.3 Description of the research project and expected outcomes, and
 - 39.1.4 Identification of the lead agency.
- 39.2 Monitoring components of the program are described in Table 4, including:
 - 39.2.1 Monitoring parameter,
 - 39.2.2 Frequency of monitoring,
 - 39.2.3 Description,
 - 39.2.4 Data management, and
 - 39.2.5 Review and reporting processes.

40 Reporting research and monitoring results

- 40.1 Outcomes and recommendations of the Strategic Research and Monitoring Program will be reported in annual performance reports prepared in accordance with Part 7 of this Plan. Table 4 identifies those parts of the monitoring component of the program that will be reported in the annual performance reports.
- 40.2 Recommendations of the annual performance report form the basis for amendments to this Plan in accordance with clause 50.
- 40.3 Research results may also be periodically reported and published in scientific journals.

41 Priorities and timeframes

Table 3 of this plan categorises research priorities into levels relevant to the risks identified through the environmental assessment process (refer to Clause 8) and provides information necessary to support the objectives of this Plan as follows:

- 41.1 Level 1 (Planning): Within first 12 months of commencement of this Plan.
 - 41.1.1 Develop SMP research plan and identify budgetary requirements and funding sources.
- 41.2 Level 2 (Actions): Immediate and ongoing.
 - 41.2.1 Research associated with ongoing actions undertaken to implement this Plan.
- 41.3 Level 3 (Applied research): As required to meet the objectives of this Plan.
 - 41.3.1 Research requirements identified from the environmental assessment process to mitigate adverse impacts of the SMP.

42 Funding sources

- 42.1 The implementation of the programs within the SMP, including research and monitoring will need support by appropriate funding arrangements. The range of funding sources that exist and can be potentially accessed include NSW State Government funding, federally funded grant programs, and/or funding through Commonwealth agencies.
- 42.2 Similar research will be undertaken in adjoining states, particularly Queensland where the largest Australian shark control program is conducted, and internationally. Opportunities to conduct joint research programs with other partner agencies (including those conducting shark-related research) and to apply research results from other states will be actively pursued in order to utilise the funding available in NSW in the most cost-effective manner.

Table 3 - Research topics and components

Research topic	Priority	Order of research components	Description of research project and expected outcomes	Lead agency
1. Identify information gaps and research needs				
1. Assess research and information needs.	Level 1	1. Categorise information gaps and research needs. 2. Identify research priorities, funding requirements and possible sources of funding.	Addresses a number of ecological risks of the current shark meshing program as identified in the environmental assessment (EA) by: <ul style="list-style-type: none"> • Identification and prioritisation of data gaps for the activity and its environmental impact. • Establishing a proposed research budget and identifying possible sources of future funding. • Providing support for reviews of this Strategic Research and Monitoring Program and this Plan. 	DPI. Potential partners: Fisheries QLD, ARC, CSIRO Marine Research, KwaZulu-Natal Sharks Board (South Africa) and any other relevant agencies or universities.

Research topic	Priority	Order of research components	Description of research project and expected outcomes	Lead agency
2. Data collection and review of existing data				
2.1 Evaluate and refine data collection methods	Level 2	<ol style="list-style-type: none"> 1. Assess data collection methods used in the SMP. 2. Develop refined catch data process and identification resources. 3. Identify associated training programs for observers and Contractors. 	<p>Data collection methods include the use of catch reporting forms, observer observations, Contractor weekly/monthly returns and sampling (e.g. tissue and DNA).</p> <p>These data sources will be continuously appraised and refined to optimise data and sample collection opportunities.</p>	<p>DPI.</p> <p>Potential partners: OEH, Fisheries QLD and KwaZulu-Natal Sharks Board.</p>
2.2 Collect genetic samples to compare with reported species identification	Level 2	<ol style="list-style-type: none"> 1. Collect shark genetic samples and cross-reference with reported species identification, where necessary. 2. Identify associated training programs/resources for observers and Contractors. 	<p>Appraise accuracy of catch records and, if necessary, identify any major indicators showing where better resources and training/sampling protocols should occur.</p> <p>Delineate the two main sources of identification of species – routine (phenotypic analysis) and genetic (DNA analysis) – to guide the development of identification resources and training protocols.</p>	<p>DPI in conjunction with suitable research partners.</p>
2.3 Evaluate data on temporal and spatial factors affecting the operation of the SMP	Level 2	<ol style="list-style-type: none"> 1. Collaborate with research being conducted by CSIRO Marine Research on white shark movements. 2. Assess existing data on other species (e.g. tiger shark, bull shark). 3. Examine existing data on spatial and temporal movements of non-target species. 	<p>Research can provide evidence for site fidelity, temporary residency and common pathways used by sharks and how this may be used to identify high-risk periods and hot spots (e.g. coastal migrations of white sharks in Australian waters).</p> <p>Research can provide spatial and temporal movements of non-target species (such as cetaceans and other marine mammals, marine reptiles and other species) to guide research needs and minimise interactions with non-target species through modifications to the SMP.</p>	<p>DPI.</p> <p>Potential partners: CSIRO Marine Research, Universities, ARC, & OEH.</p>
2.4 Analyse data on shark interactions and beach usage	Level 2	<ol style="list-style-type: none"> 1. Access/evaluate data collection by various organisations. 2. Examine data on beach usage rates. 3. Develop better links between agencies and develop systems to optimise collection and use data. 	<p>Various groups are currently collecting data on interactions with sharks and on beach use on an ad-hoc basis (e.g. Surf Life Saving organisations; Coastguard, Police, Taronga Zoo etc.).</p> <p>There needs to be better coordination of this information for use in shark-control risk assessments and to guide modifications to SMP.</p>	<p>DPI.</p> <p>Potential partners: Surf Life Saving Organisations, Coastguard, NSW Police Force, Taronga Zoo - Australian Shark Attack File.</p>
2.5 Appraise effectiveness of fishing operations	Level 2	<ol style="list-style-type: none"> 1. Evaluate NSW shark meshing net configurations. 2. Review the application of 	<p>To develop the optimal application of fishing gear technology used in the SMP (giving regard to potential</p>	<p>DPI.</p> <p>Potential partners:</p>

Research topic	Priority	Order of research components	Description of research project and expected outcomes	Lead agency
used in shark control programs.		other bather protection measures for use in NSW as per those highlighted in the 2015 independent review plus Shark Summit, and subsequently incorporated into the new NSW Shark Management Strategy.	<p>impacts on Threatened Species and non-target species and the variations of conditions experienced in NSW when compared to other programs).</p> <p>Progressively implement improvements in gear selectivity, where proven effective, and incorporate into future modifications in the SMP.</p> <p>Investigate and trial suspended nets (i.e. set ~1m off the bottom) to assess their ability to:</p> <ul style="list-style-type: none"> • further reduce the by-catch of non-target sharks and rays, • maintain the very low catch rate of marine mammals, and • reduce the incidences of interactions between bathers and target sharks. <p>Note: The use of baits and lures to attract sharks is currently not permitted by the terms of SMP contracts.</p>	Fisheries QLD & other agencies with expertise in shark control programs nationally and internationally.
3. Establish/support collaborative research (e.g. CSIRO, other government agencies and Universities)				
3.1 Impacts of shark meshing.	Level 3	<p>1. Distribution, abundance, biology and ecology of target species affected by the SMP.</p> <p>2. Distribution, abundance, biology and ecology of non-target species affected by the SMP.</p>	Research to guide modifications to the program to optimise the achievement of objectives of this Plan and the JMA related to minimising environmental impacts of the SMP.	<p>DPI.</p> <p>Potential partners: CSIRO Marine Research, ARC, OEH, research institutions and Universities.</p>
3.2 Establish DNA library of shark species taken in the SMP to contribute to improved knowledge on affected species population structure.	Level 3	<p>1. Conduct collaborative research with relevant research institutions.</p> <p>2. Develop SMP DNA library.</p>	These analyses can provide significant information on the biology of sharks, including the degree of genetic structuring in a population, while inferences can be made from the data with respect to the residency of shark populations.	DPI in conjunction with relevant research institutions.
3.3 Conduct scientifically-based shark interaction risk assessment	Level 3	<p>1. Compile data from research relating to identified high-risk elements.</p> <p>2. Apply standard risk assessment model (i.e. AS/NZ: 4360).</p>	Use risk assessment to apply current information (e.g. spatial, temporal, biological, oceanographic, shark behaviour, prey movements, beach usage and historic captures etc.) to form a predictive, scientifically rigorous risk assessment from which better application of bather safety	<p>DPI.</p> <p>Potential partners: Fisheries QLD and other agencies with expertise in shark control programs nationally and internationally.</p>

Research topic	Priority	Order of research components	Description of research project and expected outcomes	Lead agency
			measures can be developed.	
3.4 Collect morphometrics on sharks and other species caught in the SMP.	Level 3	1. Continue collection of morphometric data for species captured in the SMP to contribute to collaborative research initiatives if/when requested.	<p>Morphometrics (biological shape analysis e.g. length/distance between physical features, shape, size, colour etc.) could support a number of identification resources and objectives of this Plan.</p> <p>Morphometrics may be used in future in image analysis software to identify sharks from digital photography. The data can also help:</p> <ul style="list-style-type: none"> • Identify sharks responsible for bites • Determine length/age estimates from samples. • Predict how long it may be until a released target species (e.g. small white shark) may become a threat. • Identify species in an advanced state of decomposition. 	By DPI or research institutes as part of any research project where this data is required.

Table 4 – SMP Monitoring Program

Monitoring parameter	Frequency	Description	Data management	Review & reporting process
1. Shark Meshing Contractor Catch Report.	Weekly.	Details all catches of target and non-target species taken in nets by each Contractor as submitted by the Contractor and authorised by the observer. Provides weekly data of: date, beach, species, sex, fork length, life status, stomach contents, sample taken, number or pups, photo taken, wind direction/speed, water temp. Also includes data for marine mammals, reptiles and birds captured in nets and whether DPI and OEI were notified and disposal details of carcass/samples.	DPI collects and collates into monthly summary report and enters into database of target and non-target species.	Reviewed by DPI weekly. Reported through DPI monthly Catch Summary Report.
2. Shark Meshing DPI Catch Summary Report.	Monthly from DPI.	Details all catches taken in nets by Contractors over each month of the season. Includes catch data for sharks, teleosts, marine mammals, reptiles and birds to help determine the mortality and species composition of target and non-target species catch and any increases in interactions with the SMP.	<p>DPI collates and sends to OEI, FSC and SC.</p> <p>Supports alignment with TS recovery plans.</p> <p>Details of catches in SMP are made public.</p>	<p>Monthly review by DPI Shark Biologist and OEI.</p> <p>Reported through Annual Performance Report.</p>

Monitoring parameter	Frequency	Description	Data management	Review & reporting process
3. Tagging program.	All captured live sharks and marine turtles must be tagged and released by Contractors with tags supplied by DPI & OEH (except Greynurse sharks, which are not to be tagged).	Tagging of all live sharks (except Greynurse) and marine turtles will provide vital data on recaptures and general biology, spatial and temporal movements. These data also support Threatened Species recovery plans.	Tagging data are entered into new field in SMP database.	Reviewed by DPI Shark Biologist monthly and as part of wider research projects relating to the SMP. Recaptures of tagged turtles to be reported to OEH. Reported through Annual Performance Report.
4. Routine DNA sampling and verification.	All dead animals sampled when captured by Contractors.	Routine DNA sampling of all dead animals and certain species of live sharks will provide accurate identification and other information arising from genetic sampling (biology, distribution, movements etc) and will support research projects undertaken by DPI or collaborative researchers. These samples have formed the foundation for a DNA library of shark species taken in SMP.	Genetic sampling material is sent for analysis for positive identification if/when deemed necessary. Other capture details are also made available for further analysis by partner research agencies.	Reviewed by DPI Shark Biologist monthly and reported in the Annual Performance Report and as part of wider research projects relating to the SMP.
5. Shark vertebrae and other tissue samples	All dead sharks sampled when captured by Contractors.	Sampling of vertebrae and tissues from dead sharks captured in the SMP provides data for age/growth analysis. Jaw collection from dead sharks will continue to support information and education opportunities. Photography will also be conducted of each specimen (all species) taken in the SMP.	Data are recorded and entered into database. Jaws kept at DPI. Photographs catalogued and held at DPI in an image collection and made available to relevant agencies for information and analysis.	Reviewed by DPI Shark Biologist monthly and reported as part of wider research projects relating to the SMP.
6. Monitoring of all shark interactions.	As reported in NSW or monthly and sourced from relevant agencies.	The Shark Report Log is used by SLSNSW to document shark interactions and sightings on NSW beaches. The log records all relevant details pertaining to each interaction or incident (e.g. shark description and behaviour, weather, victims' details and injuries etc). Other agencies document shark interaction details and these are generally submitted to the Australian Shark Attack File held by Taronga Zoo.	Data are submitted to Australian Shark Attack File. DPI accesses Shark Report Log data and Australian Shark Attack File updates.	Reviewed by DPI Shark Biologist monthly or on first becoming available. Interactions on SMP beaches reported through Annual Performance Report.
7. Monitor technological advances in shark control measures.	As developed and sourced from relevant agencies. This component is incorporated	Technological advances in shark control measures may emanate from agencies conducting shark control measures (e.g. Fisheries QLD, KwaZulu-Natal Sharks Board and others) and were	Data are considered for application to SMP taking into account NSW conditions, likelihood of improving the bather safety	Evaluated by DPI Shark Biologist on first becoming available. Reported through

Monitoring parameter	Frequency	Description	Data management	Review & reporting process
	in the new NSW Shark Management Strategy announced in late 2015.	independently reviewed in 2015.	program and potential effects on Threatened Species.	Annual Performance Report.
8. Population trends and patterns of movements of dangerous sharks and interaction behaviour.	As developed and sourced from relevant agencies as part of the new NSW Shark Management Strategy.	Data on trends of species of dangerous sharks provides obvious benefits for the SMP in relation to bather protection. These data can be used to help develop an 'encounter risk' in certain predictable areas and times. This may have ramifications for reducing unwanted interactions with dangerous sharks including minimising catch of non-target species and shark interaction by identifying temporary hotspots and periods of higher than usual encounter risk.	Data are produced by DPI and other agencies as part of collaborative research programs or other national and international research. DPI assesses data during review of the SMP and considers when any modification of the program is required.	Reviewed by DPI Shark Biologist on first becoming available. Reported through Annual Performance Report.
9. Patterns of recreational water contact activities in marine waters.	As developed and sourced from relevant agencies.	Data on trends and patterns of water contact activities may provide insight into existing and future risk areas for bather protection.	Data are produced by the aerial surveys conducted by DPI, plus organisations such as SLSA and in government reports (e.g. SOE Report).	Reviewed by DPI as part of the annual review of the SMP. Reported through Annual Performance Report.
10. Threatened Species recovery plan reviews.	Within 6 months of any report by relevant agency.	Threatened Species recovery plans are subject to periodic review to gauge the success of plans in achieving their objectives (e.g. recovery of secure wild populations) and may identify new or emerging threats to the species in question. An increase in the population of marine mammals and reptiles could result in an increased rate of interaction in the SMP. Any ongoing or new monitoring of interactions between shark meshing and marine mammals and reptiles will need to be cognisant of such changes as they relate to estimates of population size and distribution.	Data are acquired from OEHS and relevant agencies by DPI and are assessed during review of the SMP and considered when any modification of the program is required. Data on annual level of Threatened Species by-catch in shark control activities are supplied to the Commonwealth Department of Environment and recovery teams. Details of Threatened Species captured in SMP are made public.	Reviewed by DPI as part of the annual review of the SMP. Reported through Annual Performance Report.
11. Contractor compliance.	Annually or when major non-compliance is detected. Sourced from DPI (Fisheries	Compliance operations are undertaken periodically through on-the-spot audits and covert operations. Quality inspection forms are used to help deliver consistent compliance rate reports. Compliance is matched against trigger	An annual Compliance Report provides data on compliance by the Contractors with contract requirements	Reviewed by DPI as part of the annual review of the SMP. Reported through

Monitoring parameter	Frequency	Description	Data management	Review & reporting process
	Compliance).	points/performance monitoring (e.g. compliance with contract provisions falls below 80%).	and this Plan.	Annual Performance Report.
12. Monitor net locations by GPS.	Annually	Using hand-held GPS units observers will be able to accurately identify the exact setting locations of nets within the area of operation.	The exact location of shark meshing nets using GPS technology helps provide information in a spatial format that can be overlaid on other data sets to anticipate interactions with non-target species and improve reporting.	Reviewed by DPI as part of the annual review of the SMP. Reported through Annual Performance Report.
13. Shark Meshing Program Annual Performance Evaluation	Annually by DPI.	The goals and objectives of the JMA are critically reviewed annually against performance criteria and relevant trigger points set out in the Management Plan (including this Monitoring and Research Plan).	An assessment of the performance of the Management Plan is prepared by DPI. Recommendations for modifications to the program are provided.	Submitted to the parties to the JMA by 31 July annually.
Glossary of agencies and institutions (Tables 3 & 4)				
ARC: Australian Research Council CSIRO: Commonwealth Scientific and Research Organisation -Marine Research OEH: Office of Environment and Heritage FSC: Fisheries Scientific Committee		SC: Scientific Committee SLSA: Surf Life Saving Australia SLSNSW: Surf Life Saving NSW SOE: State of the Environment Report		

PART 7 PERFORMANCE ASSESSMENT AND REPORTING

43 Purpose

- 43.1 The purpose of the performance assessment and reporting framework is to assess the performance of this Plan in achieving its objectives, and to communicate the results transparently.
- 43.2 Performance in achieving the objectives is to be determined against the performance indicators established in clause 12. Performance reporting is to be communicated by:
- 43.2.1 Annual performance reports, and
- 43.2.2 Review reports.

44 Performance indicators

- 44.1 Performance indicators will be used to provide a tangible indication of whether the objectives of this Plan are being attained. The Strategic Research and Monitoring Program will gather information to allow the measurement of performance indicators.
- 44.2 The performance indicators and trigger points are detailed in Table 5.

45 Trigger points

- 45.1 The trigger points specify the point when a performance indicator has reached a level that suggests a potential problem with the activity that threatens the achievement of the management objectives.
- 45.2 Activation of a trigger point will initiate a formal review response. The review is to determine the suspected reasons for the tripping of the trigger point and whether any action is required.

Table 5 Performance indicators and trigger points

Objective	Performance Indicator	Trigger Point	Data Requirements and Availability
Reduce the risk to humans from shark interaction at beaches subject to the SMP.	Change in the number of human fatalities and serious injuries from shark interaction.	1 fatality or serious injury per meshing season on a meshed beach.	Shark Report Log (SLSNSW). Australian Shark Attack File (Taronga Zoo).
Minimise the impact on non-target species and to ensure that the SMP 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.	Change in the number of entanglements with non-target species and threatened species, populations and ecological communities in the SMP.	1. Entanglements of Endangered or Critically Endangered species, populations or ecological communities in a single meshing season exceed the annual average catch plus two standard deviations of the preceding 10 years for those species; 2. Entanglements of Vulnerable species or ecological communities in a single meshing season exceed the annual average catch plus three standard deviations of the preceding 10 years for those species; 3. Entanglements of other non-target species over 2 consecutive meshing seasons exceed twice the annual average catch of the preceding 10 years for those species.	Shark meshing Contractor catch reports. DPI monthly catch summary reports. Annual performance report.
Minimise occupational health and safety risks associated with the SMP.	Changes in the number of major and minor incidents reported by Contractors or observers.	1 major ^a or 2 minor ^b incidents. (a) Major incidents are incidents that result in 5 or more days lost time; and (b) Minor incidents are incidents that are reportable to NSW WorkCover or are incidents that result in between 2 and 4 days lost time.	Contractor's monthly WHS performance report. WHS report incident notifications to WorkCover.
Ensure that monitoring and reporting on the SMP is undertaken in a transparent manner.	Extent to which the public reporting requirements are met.	Annual performance report submitted to the Parties to the Agreement prior to 31 July each year.	As established by Part 7 of this Plan.

46 Annual performance reports

- 46.1 An annual performance report is to be prepared by DPI.
- 46.2 The annual performance report is to document progress in achieving management objectives by:
 - 46.2.1 Reporting on progress in implementing the measures contained in this Plan.
 - 46.2.2 Assessing and reporting on each performance indicator,
 - 46.2.3 Identifying any trigger points that have been tripped,
 - 46.2.4 Identifying any overdue actions,
- 46.3 The annual performance report will document outcomes of:
 - 46.3.1 The Compliance Plan,
 - 46.3.2 The Strategic Research and Monitoring Program, and
 - 46.3.3 The Observer Program.
- 46.4 The annual performance report will Recommend any amendments to this Plan that may be required as a result of the performance of the SMP for the meshing year including:
 - 46.4.1 The nature of the proposed change,
 - 46.4.2 The reason why the proposed change is required, and
 - 46.4.3 The effect of making the proposed change.
- 46.5 The annual performance report is the formal mechanism to identify tripped trigger points and overdue management actions that will be subject to formal review procedures and a review report. Remedial measures to address these issues will be recommended to the Parties to the Agreement through the review report.
- 46.6 The annual performance report will be submitted to the Parties to the Agreements, the Fisheries Scientific Committee and the Scientific Committee prior to 31 July each year.
- 46.7 The annual performance report is a public document. The performance report may be used by the Fisheries Scientific Committee and Scientific Committee to inform their annual review of the JMA and in formulating their advice of any deficiencies in the implementation of the JMA.
- 46.8 The SMP will be regarded as being managed within the terms of the Management Plan whilst any remedial measures associated with any unmet timeframes or triggered performance indicators are being considered through formal review processes.

47 Review reports

- 47.1 A review report must be prepared by DPI if the annual performance report identifies that a trigger point has been tripped or target timeframes for the implementation of management actions have not been met.
- 47.2 A review is to be conducted and include consultation between DPI and OEH. In some circumstances the trip may be related to a performance indicator that affects broader natural resource management issues and will require consultation with other stakeholders.
- 47.3 The review report must investigate and identify the cause of the problem and make recommendations for remedial action. Specifically the review report must:
 - 47.3.1 Identify what, if any, remedial actions or changes are required to adjust or return the performance indicator to an acceptable range within a specified timeframe, including any contingency or interim measures, or alternatively,
 - 47.3.2 Identify what, if any, changes are required to the provisions of this Plan should the review recommend that they are otherwise inappropriate.

- 47.4 In respect of any proposed amendment to this Plan, the review report must identify:
- 47.4.1 The nature of the proposed change,
 - 47.4.2 The reason why the proposed change is required, and
 - 47.4.3 The effect of making the proposed change.
- 47.5 The review report is to be provided to the Parties to the Agreements, the Fisheries Scientific Committee and the Scientific Committee within 6 months of publication of the annual performance report that identified the need for such a review report. The Parties to the Agreements must endorse the recommendations of the review report prior to their implementation.
- 47.6 Review reports are to be made publicly available.

PART 8 REVIEW AND AMENDMENT OF THIS PLAN

48 Review of this Plan

The operation of this Plan is to be reviewed:

- 48.1 Annually by performance assessment reports,
- 48.2 Periodically by review reports,
- 48.3 Following any review or amendment of the JMA that authorises the activity, and
- 48.4 At the end of the meshing season 5 years from the date of commencement of the JMA.

49 Circumstances in which this Plan may be amended

This Plan may be amended in response to any of the following circumstances:

- 49.1 A request from any of the Parties to the Agreements,
- 49.2 A recommendation of an annual performance report,
- 49.3 A recommendation of a review report, including the 5-yearly reviews,
- 49.4 A recommendation of the Fisheries Scientific Committee or Scientific Committee following an annual review of the performance of the Parties to the Agreements,
- 49.5 Following the review of a relevant recovery or threat abatement plan,
- 49.6 Following listing of a new threatened species, population or ecological community that may be detrimentally affected by the operation of the SMP.

50 Process to amend this Plan

- 50.1 Amendments to this Plan may only be made after all Parties to the Agreements have been notified of the proposed amendment. Notification is to include:
 - 50.1.1 The nature of the proposed change,
 - 50.1.2 The reason why the proposed change is required, and
 - 50.1.3 The effect of making the proposed change.
- 50.2 For the purposes of amendments arising from recommendations of an annual performance report or review report, the notification requirements are deemed to have been met provided clauses 46.4 and 47.4 have been complied with.
- 50.3 Proposed amendments are to be referred to the Scientific Committee and Fisheries Scientific Committee for comment and advice.

- 50.4 Following notification of proposed amendments, the concurrence of all Parties to the Agreements is required prior to the amendment taking effect (other than amendments under clause 51).
- 50.5 If any amendment to this Plan requires a variation to the Contracts between the Principal and third party service providers DPI will use its best endeavours to obtain the consent of the Contractors and to implement the variations to the Contracts.
- 50.6 If a Contract is not varied as required to reflect the amendments to this Plan, any shark meshing operations conducted in accordance with the terms of that Contract and during the term of that Contract are considered to be conducted in accordance with this Plan for the purposes of the JMA and this Plan.
- 50.7 A record of amendments is to be retained within this Plan.

51 Special circumstances

- 51.1 Notwithstanding clauses 49 and 50 of this Plan, DPI may at any time amend aspects of this Plan that do not result in increases to the total effort of meshing operations.
- 51.2 DPI is to notify OEH and the Minister for Primary Industries prior to any such amendments being made. Notification is to include:
- 51.2.1 The nature of the proposed change,
 - 51.2.2 The reason why the proposed change is required, and
 - 51.2.3 The effect of making the proposed change.
- 51.3 Notification details listed in clause 51.2 are to be included in the next annual performance report.

Note: Periodic emergency or administrative amendments may be required during the life of this Plan. Examples include emergency response to shark bites, or administrative changes to contract conditions not directly resulting in changes to the total effort of meshing operations.

52 Effect of an amendment to this Plan on the JMA

- 52.1 For the avoidance of doubt, any amendment to this Plan does not affect the operation or validity of the JMA.

PART 9 REFERENCES

NSW DPI (2016). *5-Year Review of the August 2009 Joint Management Agreement for the NSW Shark Meshing (Bather Protection) Program*. DPI, Orange.

APPENDIX 1:

Record of Amendments (cl.10.2 of the JMA):

Management Plan for the NSW Shark Meshing (Bather Protection) Program, July 2017

Date	Details of Amendments	Page/section	Action status	Author