Submission No 79

MANAGEMENT OF SHARKS IN NEW SOUTH WALES WATERS

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Submission to the Parliamentary Inquiry into
Management of Sharks in New South Wales waters
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1.0 RECOMMENDATIONS

- SEA LIFE Trust ANZ recommends to government that it establish a permanent coordinating body to ensure that beach safety providers work together in an integrated fashion to enhance bather safety protocols with respect to sharks. Furthermore, the coordinating body should ensure that a proper plan is prepared and funding is made available for more than just in-water mitigation options. For the first 3 to 5 years this body should be administered by the Department of Premier and Cabinet and once it is functioning smoothly it could be transferred to another agency (possibly Emergency Services).
- A Shark Management Plan Advisory Committee consisting of marine scientists, eNGOs, beach safety providers, tourism operators and coastal community stakeholders be created to provide input into the execution of the Shark Management Plan and marine research priorities. Already the Shark Management Plan has indicated a significant budget for helicopter patrols. We know that fixed wing patrols are as effective and far more economically efficient. The concern is the significant potential for critically needed funding to be wasted or misplaced based on existing, and readily available information.
- A ramped up education campaign via Shark Smart, putting greater emphasis on personal responsibility when entering the ocean. In response to particular media's hyperbolic and sensationalist reporting of shark incidents, a culture of government having duty of care for ocean recreation outside of designated safety zones (between flags within certain hours) has driven a need to respond by government to extremely rare incidences of shark/human interaction, often involving surfers outside of

recommended safe hours of operation in more remote locations. There have been no incidents involving those coming to the beach and swimming between the flags in hours of life saving operation. This must be highlighted to bring confidence back to ocean going public and coastal tourism.

The response to rock fishing fatalities (of which there are more than shark attack fatalities) has not warranted the same amount of media attention and consequently reactive management as shark incidents. Each sport (both consisting of entering natural environments outside of patrolled areas) require a level of personal responsibility, safety considerations and risk mitigation, as 100% protection of such endeavours in wild, coastal environments is neither realistic nor achievable and should certainly not come at the expense of marine wild life (shark nets and drum lines).

2.0 EXECUTIVE SUMMARY

- Shark bites sometimes occur in clusters and when this occurs the media typically report these events in sensationalist terms that drive fear in coastal communities.
- Despite the fact that more people are killed and injured as a result of rock fishing and drowning, shark bite incidents typically strike fear into people to a disproportional extent that does not reflect the relative risk of the situation.
- However people reporting higher fear levels in response to shark bites they also have a tendency not to alter their behaviour considerably in response to these fears. A recent SBS program Insight aired the TV episode Shark! on 29th Sept 2015, the program explored the extreme fear that people living in Northern NSW felt in response to recent shark bite events. When asked which members of the community were still surfing most of those present admitted to changes in their surfing behaviour such as surfing in groups, or surfing in favourable clear conditions, but the overall majority were still prepared to take the risk and pursue their ocean based activities despite the current increase in shark activity (SBS Insight 2015).
- There has been no negative impact on tourism to the area and local beaches specifically. In response to shark incidents in the N NSW area, the Ballina Chamber of Commerce ran a survey of local businesses and found that 85% had not been

affected by recent shark activity (Northern Star 2015).

- All over the world there is emerging an appreciation for sharks not only for their intrinsic value and the vital role they play in keeping the ocean eco-system healthy but also their commercial value in the growing area of eco-tourism. Countries that choose to embrace sharks and develop effective industries around conservation and eco-tourism ventures are benefiting greatly. It is estimated that the value of a single live reef shark is $73 a day and over the course of its life would add up to over $200,000 (Gallagher and Hammerschlag 2011). **The global shark eco-tourism sector is worth over US $314 million annually and is predicted to more than double in the next 20 years to an excess of US$780 million in tourism dollars. (Cisneros-Montemayor et al., 2013).** N NSW must harness this potential from its unique marine biodiversity.

- Killing sharks, or shark culls (via drum lines or shark nets as mitigation tools) in response to shark attacks is neither supported by wider coastal communities nor environmentally sustainable from an ecosystem health perspective.

3.0 SUBMISSION IN DETAIL *(NB: the majority of this section 'submission in detail' has been prepared by Sharnie Connell of Manly SEA LIFE Sanctuary & No NSW Shark Cull but is reflective of the SEA LIFE Trust ANZ's views. It consists of the status of shark populations globally, existing shark mitigation programs and their impacts upon marine life and the work that SEA LIFE Trust has funded and carried out to raise awareness of the issues of shark nets and drum lines on marine wild life, leading to a call for non-lethal shark mitigation alternatives to replace them.*

3.1 Changes in shark numbers, behaviour or habitat

Generally speaking there has been a decline in overall shark abundance worldwide of 90% (Atwood et al., 2015) over the last 50 years due to a combination of commercial, recreational fishing and shark culling operations. It is estimated that somewhere between 63 million and 273 million sharks are currently caught each year and 74 million of these are for

their fins alone (Worm et al., 2013). This level is unsustainable and if not addressed urgently will result in species extinction along with catastrophic irreversible changes to marine eco-systems worldwide.

The current species classification for the three most dangerous species of sharks are as follows:

1. White shark which is listed as vulnerable to extinction on the IUCN Red List of Threatened Species and as such is fully protected under the Environmental Protection Biodiversity and Conservation Act (EPBC Act 1999).
2. Tiger sharks and Bull sharks are both classified as near threatened with extinction on the IUCN red list (IUCN 2015).

Despite the anecdotal reports from fishers and surfers, the scientific evidence is clear that there has been a huge decline in the number of white sharks in Australian waters in the last 60 years. (Issue Paper 2013). Information from the Queensland Shark Control Program (SCP) suggests a decline in tiger shark populations as the catch per unit effort data reveal a pattern of smaller catches of this species over time (Holmes, et al, 2012). Bull sharks population estimates vary around the world with increases in some areas and declines in others (Simpfendorfer and Burgess 2009).

A review of the 2002 White Shark (Carcharodon carcharias) Recovery Plan, finalised in November 2008, concluded that it was not possible to determine if the white shark population in Australian waters has shown any sign of recovery (DEWHA, 2008). Considering the lack of evidence supporting a recovery of white shark numbers - together with historical evidence of a greater decline in white shark numbers over the last 60 years as compared to other shark species — the review supports the white shark's current status as vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).(Aust Govt 2013). There is, however, historical evidence of a greater decline in white shark numbers Australia-wide over the last 60 years, and no evidence to suggest that white shark numbers have recovered substantially since receiving protection (Aust Govt 2013).

The white shark was listed as vulnerable under the EPBC Act on 16 July 1999. The basis for this listing was calculated by assessing the evidence of declining population, the knowledge of this shark species biology in terms of life span, low levels of reproduction and slow rate of sexual maturation and, at the time of listing, significant ongoing pressure from the Australian commercial fishing industry. There was substantial evidence to suggest that a significant decline in the population size had taken place in Australia. Other data such as NSW SMP catch per unit effort showed a 70% decline in numbers and furthermore a 95% decrease in sport fishing catch in South Australia was documented between 1960-1999. (White Shark Recovery Plan 2013).

These animals have been protected since 1999; despite this current east coast populations are predicted at between 500 – 1200 adult animals (Barry Bruce, research paper in progress).

The SMP itself has been used as a sampling tool to assess and map the abundance of shark populations on the NSW coast. Over the last 60 years catch per unit effort has shown a marked decline in 5 taxa of shark caught in the SMP including hammerheads, whalers, angel sharks, white sharks and grey nurse sharks furthermore the size of tiger sharks and white sharks has significantly decreased over the last 60 years (Reid et al., 2011). This suggests that these species are less able to grow to adult size due to human pressures such as over fishing, shark meshing impacting their likelihood of surviving until adulthood.

3.2 The risk of shark bite is incredibly low

There is evidence that the global rate of shark bite including fatal shark accidents has increased over the last 30 years however most of this increase can be attributed to the 52% increase in global population during this time and also the increase in people spending time in the ocean for much longer periods of time than ever before due to the commercial availability and development of exposure suits. Other contributing factors are likely to include changes in the abundance and distribution of food sources, and human factors such as habitat changes forcing sharks to be displaced into other areas (McPhee 2014). It is

important to note that millions of people share the ocean with potentially dangerous sharks each day with minimal consequences as a result therefore the probability of a shark encounter is highly unlikely (Neff and Heuter 2013). On average less than 10 people worldwide die from shark bites each year, and so far this year 2015 in NSW there has been one fatality from a shark bite incident. (ASAF 2015). “There is no compelling body of evidence that suggests that the population abundance of relevant shark species is increasing, or increasing to the extent to explain the increasing trend in unprovoked shark bites”(McPhee, 2014).

Many theories abound regarding the cause of shark bite (West 2014), the following theories are that are highly unlikely to be true include:

- Sharks and hungry and target people for food – if this were the case people would often be consumed by sharks which is not the case, most incidents involve one bite and then the shark retreats.
- Sharks are attracted to human blood – sharks have not evolved to detect human blood in their environment and as a result show little brain activity in response to human blood as compared to the large response they exhibit to fish blood.
- Sharks are attracted to certain colours – sharks are colour blind and they are more attracted to high contrast such as white on black.
- Sharks are defending their territory – there is no evidence that any species of shark displays territorial behaviour by aggressively defending a physical area claimed as their own.
- Sharks are hungry due to overfishing – large migratory sharks have the ability to move vast distances to find food and feed infrequently so this theory is unlikely.
- Sharks in particular tiger sharks will eat anything – it is likely that metal objects found occasionally in sharks stomachs were eaten in response to the electromagnetic field given off by these objects confusing the shark that it is food, or that objects such as rocks are swallowed accidently during in feeding activities.

- The rogue shark theory – suggests that a singe shark after aquiring a taste for human blood will bite humans again and again – there is no evidence to substantiate this theory.
- Shark populations have increased – there is much scientific evidence that points to the substantial decline in shark numbers of most species over the last 60 years, overall approximately 90% of sharks in the ocean have been killed by humans in the last 60 years.

In some cases of shark bite incidents the following theories have scientific evidence to substantiate them and are likely:

- Mistaken identity - mistaking humans as natural prey items much as the sillouette of a surfer on a board resembles a seal or a turtle when viewed from below.
- Sharks are inquisitive and bite as an effective behaviour to sense an unfamiliar object to determine what it is by utilising the senses of smell, taste and feel simultaneously.
- Sharks are initially attracted by low frequency sounds and may approach to further examine objects using other senses.
- Sharks bite boat motors or shark cages as the metal in the motor they give off an electromagnetic field that the shark is attracted to, not that the shark is trying to attack the people on the boat or in the cage.
- Sharks may be defending themselves if they perceive a human to be a threat, they will often posture with fins down and back arched to signal that they feel threatened and may bite as a defensive reaction to protect themselves against a human in the water.
- Sharks may be warning the human to stay away – sharks often behave this way with each other bumping, tail slapping or briefly biting each other to protect personal space, or in a dominance display.

3.3. Adequacy of management strategies

The NSW Shark Meshing Program (SMP) is a lethal shark mitigation policy that has been in place since 1947 in NSW. It is managed by the Department of Primary Industries (DPI) fisheries NSW, contractors (fishers) carry out the program. The nets are set on 51 of the most popular beaches from Newcastle to Wollongong. Each nets on each beach is 150 metres long and 6 metres high and are set in 10-12 metres of water. Sharks are able to swim over them and around them. Nets are in the water approximately 17 days per month set 3 days at a time and must be set on weekends and public holidays. The SMP operates for 8 months of the year from the 1st September to 31st April. The nets are random and indiscriminate killers of marine life and it is reported that in excess of 17,000 marine animals have been caught in shark nets in NSW although NSW Fisheries dept reports state that this figure is an underestimation of total numbers of animals caught due to poor date collection prior to the 1990's (Review SMP 2009).

The SMP is a culling program designed to reduce the numbers of sharks to therefore reduce the likelihood of shark bite incident. "The objective of shark-control programs is to provide the public with protection against shark attack at popular beaches by a local reduction in large shark numbers. This is achieved by fishing for sharks directly off the beaches, using large-mesh gill-nets or baited drum-lines or both, thereby reducing the likelihood of a dangerous shark coming into contact with humans. Notable shark control programs are in operation in NSW and Queensland, and KwaZulu-Natal (South Africa)." (Mcphee 2012)

3.4 The effectiveness of the shark meshing program is not substantiated

Without conducting any scientific studies It is falsely claimed in the SMP annual reports and in statements made to the media by NSW DPI that the SMP has been effective at keeping people safe as there has only been 1 fatal shark bite at a meshed beach. What they fail to mention are the other factors that contribute to this low number of fatalities.

Fatal shark incidents are tragic events however with increasing medical technology and quick response first aid the vast majority of shark incidents are survivable – this was not the case back in the 1930's when the NSW program was first put in place. The low numbers of shark

bites fatalities on meshed beaches are more likely to be attributable to the presence of lifeguards who are able to detect sharks, chase them away from the area on jet ski's or inflatable boats, sound shark alarms and remove people from the water when they are sighted, they also have the power to close beaches, erect warning signs to alert swimmers to the presence of sharks and provide immediate medical assistance in the event of a shark incident, reducing the chance of a bite becoming fatal. Beaches with shark nets are more populated and thus are closer to medical help if needed. These issues are more likely to be the cause of the low number of fatalities on meshed beaches. Furthermore sharks are much less likely to bite people at a crowded beach – the more people in the water the less likely the shark is to bite people this may be due to noise, or the fact that sharks are opportunistic predators who more likely to bite people and animals that are on their own in the water. (there has never been a shark incident between the flags at a beach).

Since the 1930's when the SMP was first implemented there has been a reduction in fatal shark bites due to improvements in medical technology, people often died from blood loss or subsequent infection this has been reduced considerably in the last 80 years following the increased training of the general public in basic first aid practices following shark bite such as application of a tourniquet, and leaving wetsuits on people that have been bitten this information was not widely available to the public historically.

NSW DPI claims that the SMP has been effective in keeping bathers safe at the beach with absolutely no scientific evidence to back up this claim. There have never been any controlled studies between meshed and unmeshed beaches and none of the extraneous variables described above have been considered in any of the SMP annual reports. The SMP annual reports are scientific documents prepared and written by scientists and as such all extraneous factors should be considered in any valid scientific assessment and should be considered for their potential to influence the findings. Simply because a protective measure such as the SMP is in place on a number of beaches and there is a lower number of fatalities on those beaches does not imply causality, this merely implies a correlation and the effect of the SMP itself maybe completely negligible until further studies are conducted, first year science students at university level are taught this very basic concept as a primary rule for conducting all their scientific analyses throughout their careers, it is astonishing that the

scientists that have compiled these reports have ignored this very basic concept. Not surprisingly when put under peer review by the Fisheries Scientific Committee (FSC) the SMP annual reports have been met with the same criticisms each year excepts below taken from the FSC letter in the appendix section of the SMP from 2010 – 2014.

- "the annual performance report contains no scientific data or information that would allow anyone to assess the success or lack thereof of the program itself" (SMP 2010).

- "first the annual performance report contains no scientific data or information that would allow anyone to assess the success or lack thereof of the program itself. The statement that the SMP has been effective at providing a safer environment for swimmers is unsubstantiated because no comparison of shark numbers or attacks is made between meshed and unmeshed beaches". This is the same criticism that the FSC had in the 2009-10 assessment of the SMP, but which has not been addressed in the 2010-11 report. We encourage the SMP to provide this information in the 2011-12 Annual Performance report so that the program can be properly assessed" (SMP 2011).

- "The Annual Performance Report contains little scientific data or information with which to evaluate the success or lack thereof of the program itself. The statement that "The SMP has been effective at providing a safer environment for swimmers" is unsubstantiated because no formal comparison of shark numbers or attacks has been made between meshed and unmeshed beaches. This is the same criticism that the FSC had in both the 2009-10 and 2010-11 assessments of the SMP, but which has not been addressed in the 2011-12 report. We urge the SMP to provide this information in the 2012-13 Annual Performance Report so that the program can be properly assessed. An assessment of the program is important because it is listed as a Key Threatening Process for several species of sharks. If the program is not effective at providing a safer environment for swimmers in meshed beaches than unmeshed beaches, then there may be a

need for modification or discontinuation of the SMP (SMP 2012).

- "The annual performance report includes the statement that "The SMP has been effective at providing a safer environment for swimmers". As the Committee has done in its review letters found in the appendix section in previous years, it reiterates that this statement is unsubstantiated because it is not based on a scientific comparison between meshed and unmeshed beaches of shark numbers, interactions or attacks. This is the same criticism that the FSC had in the 2009-10, 2010-11 and 2011-12 assessment of the SMP, but which again has not been corrected in the 2012-13 report. The FSC requests the SMP remove this statement from the 2012-13 Annual Performance Report" (SMP2013).

- "the FSC trusts that the superficial reporting of research and monitoring outcomes in annual SMP reports will not be promulgated in the 5-year review report, as without sufficient detail there can be no rigorous review, or transparency in the outcomes of the program. In particular, the Committee would like specific reporting and analyses in the following key issues to be included in the five-year review: - A rigorous scientific comparison of data within each management zone on shark sightings, shark attacks and beach usage rates between meshed and unmeshed beaches; At the individual shark level, more understanding of shark movements around nets and the beaches of NSW. Such data would provide critical information in the assessment of public safety and the efficacy of nets in preventing shark attacks" (SMP 2014).

It should be noted that the FSC letter and the NSW Scientific Committee letters have been omitted from the SMP (2015) Annual Performance Report. The SMP (2015) states that these documents are available to the public, extensive searches of the DPI website conducted whilst writing this submission have not yielded a result. An email on behalf of No Shark Cull has been sent to the FSC to attempt to obtain a copy of these letters to acertain the peer review critique of the SMP (2015).

In 2009 the SMP review report states that overall “the annual rate of shark attack is the same both before and after the meshing program commenced” (Review SMP 2009).

There have been 45 shark interactions including severe bites and a fatality on meshed beaches. The following is a list of these incidents:
2 Jan 1938 - Cronulla (where Ernest Barker was thrown into the air and surf ski mauled)

1 Jan 1942 – North Steyne - Shark bites surf paddle

6 April 1947 – Palm Beach – Shark scrapes surfboard of 17 year old Max Watt

14 Nov 1947 – Nobby’s Beach – Surf ski bumped while 16 year old John Martini and 17 year old Peter Curruthers fishing

25 Jan 1948 – Mona Vale – Surf ski of David Button bitten

14 Jan 1949 – Mona Vale – Surf ski of Don Dixon bumped

14 Jan 1949 – North Bondi – Vince Wilson (32) chased by not one, but three sharks while surfing

1 Feb 1951 – Bondi Beach – Harry Sheen (14) has leg bitten while swimming

26 March 1951 – Avalon – Ken Davidson (23) fell off surf ski (and received minor lacerations to chest)

6 December 1951 - FATALITY at Newcastle netted beach (Merewether) – Frank Olkulich (21) local surf ski champion bitten fatally while treading water

01 December 1953 – Maroubra – Shark charged Jack Haynes surf ski

05 Jan 1956 – North Bondi – Shark bumped Ken Howell (25) surf ski

11 March 1956 – Cronulla – Ian Nolan (13) right thigh gashed while bathing

23 April 1957 – Merewether – Paul Wilson (15) suffered minor injuries from a shark while surfing

27 April 1959 – Maroubra – Peter Holland (22) received thigh lacerations while spearfishing

27 December 1960 – Bondi – Shark brushed past Despo Snow-Christensen (27)

21 Jan 1962 – Cronulla – Robert Smith (19) suffered from shock after being immersed underwater by speared shark

13 Sept 1963 – Wanda Beach – Shark bit surfer Peter Barron (18) on torso

27 Feb 1966 – Coledale Beach – 2.5m immature female white shark bit left leg and lower right leg of Raymond Short (13) while body boarding. The shark was still attached to Raymond leg when he was brought to shore.

26 December 1966 – Coogee – David Jensen (29) had right leg bitten while spearfishing

30 November 1967 – Wollongong – Jeff Short (15) incident with grey nurse while freediving

07 April 1968 – Stockton – Ray Weaver (47) suffered foot lacerations from a blue shark

25 March 1969 – Newcastle – William Hill (67) suffered foot lacerations from a mako shark

15 October 1992 – Avalon Beach – Scuba Diver Dave Gannicott receives minor injury on his foot when he was bitten by a female nurse shark who was caught in a net and delivering a pup.

25 April 1996 – Mona Vale – Aya Hamaea (16) and Luke Baker (11) both received puncture wounds in their leg by a suspected wobbegong while swimming

14 March 2000 – MacMasters Beach - Surfer Craig Roth (40) knocked from board by suspected tiger shark. Shark grabbed leash of board and pulled him seawards.

8 April 2001 – Bronte Beach – Andranik Markossian suffered wrist lacerations from wobbegong shark while snorkelling

12 April 2002 – Bar Beach, Newcastle – John Schneider (45) had foot bitten by bronze whaler while swimming

11 Feb 2003 – Coogee Beach – Tom Plumridge (24) received puncture wounds on heel, leg and buttocks while swimming

11 Feb 2004 – Caves Beach – Luke Tresoglavic (22) had his leg bitten by a wobbegong shark while snorkelling

21 October 2004 – Stockton – John Gresham (59) has his right foot lacerated while surfing

16 April 2005 – Bronte – Simon Letch (40) had surfboard bitten by bronze whaler

15 March 2006 – Bondi – Blake Mohair (15) had his surfboard nudged by a 2m bronze whaler

11 April 2006 – Newcastle – Luke Cook (15) received minor lacerations on his foot from a juvenile bronze whaler while surfing

12 February 2009 – Bondi – Glen Orgias (33) loses left hand after being bitten by 2.5m white shark while surfing

1 March 2009 – Avalon – Andrew Lindop (15) bitten on leg by suspected 2.6m white shark while surfing

26 December 2009 – Avoca - John Sojoski (55) received lacerations to lower leg after accidently stepping on shark

11 Feb 2010 – Mona Vale – Surfer Paul Welsh (46) bitten on left lower leg by a wobbegong shark while teaching son (10) to surf

7 December 2011 – Maroubra – Ronald Mason (14) bitten on leg by a wobbegong while surfing

3 Jan 2012 – North Avoca – Surfer Mike Wells (28) receives about 50 puncture wounds to right arm by a suspected bronze whaler

18 Jan 2012 – Redhead Beach – Glen Fokard (44) bitten by white shark on thigh while surfing

17 Oct 2014 – Avoca – Surfer Kirra-Belle Olsson (13) was bitten on left calf and ankle, and received puncture wounds to left foot while surfing.

5 Feb 2015 – Merewether – Bodyboarder Ben McPhee bitten on ankle by 1.8m shark (believed to be a bull shark).

8 Sept 2015 Shelly Beach (Central Coast NSW) – Surfer Justin Daniels (42) bitten on his left hand shark type unknown.

3.5 The nets are not a complete barrier headland to headland sharks can swim over and around the nets.

"Unlike small-mesh shark-exclusion nets that are deployed in waters sheltered from currents and wave action, shark-control gear on exposed beaches does not form an impenetrable barrier and hence does not eliminate the risk of shark attack" (McPhee 2012). Furthermore

"use of other destructive methods such as baited drum-lines and shark nets do not guarantee that beaches are free of sharks of a size or species that pose a risk to humans" (McPhee 2012).

Shark nets as used in the SMP do not stop sharks from coming close to the beach evidenced by "the fact that 35% of the catch is caught on the shoreward side of the nets" (Dudley 1996).

Shark nets themselves pose a considerable risk to humans when they become dislodged or people swim or dive near them, there are two known examples of children dying as a result of entanglement in shark nets.
In 2007 15yo Boy drowns in shark net while spear fishing in NSW central coast near Shoal Bay. http://m.perthnow.com.au/news/boy-15-drowns-in-shark-net/story-e6frg12c-1111113167964

In 1992 8yo boy drowns in shark net in QLD Nobbys Beach.
http://www.theaustralian.com.au/news/latest-news/warning-gold-coast-shark-nets-ripped-loose/story-fn3dxity-1226394014955?nk=f7785edfcfdf836e50cbb18c2b8101ac (need to reference in the bibliography).

Losses of shark nets are reported in almost every year that the SMP has been operating – this poses an unacceptable risk to both humans and marine life with nets lost at sea becoming ghost nets which like serial killers continue to kill anything that swims into its path until the net itself washes up on a beach and can be retrieved which may be never "Sydney North contractor reported on 24th April 2015 the Avalon net was missing, this was due to the severe storm activity that week" (SMP 2015).

Shark nets themselves may become a threat if large sharks are brought into the area by the thrashing of entangled marine animals or their decaying bodies between fisheries contractor net checks "baited lines were not used in NSW in case they attracted sharks. It could also be argued however that sharks are attracted to animals captured in nets. About 4% of the

sharks captured in the KZN nets were scavenging on other captured animals, and scavenging on dolphins and dugongs caught in the Queensland nets has been documented" (Dudley 1996).

3.6 The NSW SMP is a shark culling program

The NSW DPI SMP reports in recent years have moved away from the wording that the SMP is a shark culling program – Instead the SMP reports now state that the way the program works is to disrupt the swimming patterns of target sharks in order to deter them from setting up territories. "The SMP began in Sydney in 1937 and since then has had varying objectives including but not limited to reducing the risk of shark attack for surfers and swimmers, culling of large aggressive sharks, and deterring large sharks from establishing territories adjacent to metropolitan swimming beaches" (Review SMP 2009). This change in wording of the objective of the program is likely in response to the SMP being listed as a key threatening process for certain species of marine animal including targeted white sharks who are listed as vulnerable on the IUCN red list. However it should be noted that the home range of shark species targeted in the SMP varies widely from several hundred kilometres for bull sharks and a home range that extends several thousand kilometres for tiger and white sharks there is no conclusive evidence that any shark is territorial and defends that territory (Gruber, et al, 1988; Myrberg and Nelson, 1991). Furthermore at the recent NSW Shark Summit 2015 world renowned experts Barry Bruce (white shark) and Professor Colin Simpendorfer (tiger and bull sharks) were asked the question if these three species of shark display territorial behaviour and the response was a definitive "no sharks display territorial behaviour".

"The white shark is not known to form and defend territories and is only a temporary resident in areas it inhabits. However, its ability to return on a highly seasonal or more regular basis implies a degree of site fidelity that has implications for repeat interactions with site-specific threats" (Bruce et al., 2005).

Alternatives to the current lethal shark meshing program have been tested and are ready to roll out in NSW.

Approx Cost of the Shark Meshing Program in NSW = $1.6million per year for a program of shark nets: A single 150m long net is deployed on each of 51 beaches from Wollongong to The Hunter NSW for 17 days of the month, over 8 months per the year. Designed to cull sharks by catching, entangling and killing large sharks to keep the numbers low - the nets work on the principal that less sharks equates to less chance of shark encounter. **Cost = $200,000 per month.**

DPI scientists state that there are no viable alternatives to lethal measures at this time– however this is not the case the Eco shark barrier has been trialled successfully in for 3 months in 2014 on Coogie Beach W.A. and other non-lethal methods are now ready to be trialled. DPI is experiencing a conflict of interest as they manage the shark meshing program and peoples jobs are on the line if they lose funding for this. noNSWsharkcull would like to see the state government call for expressions of interest for alternative shark / beach protection measures and see what innovations respond to this call.

NETS CAUGHT OUT - Manly Daily 29th October 2014

MOST SPECIES BEING TRAPPED ARE HARMLESS, VULNERABLE

MORE than 90 per cent of the creatures caught in shark nets off the coast of the northern beaches are vulnerable and no threat to humans. Picture **A tangled-up dead baby humpback whale is dragged off near Mona Vale.**

Only eight "target" sharks were caught in our nets between September and April, while 75 "non-target" animals were caught — mostly rays and hammerhead sharks.

More than half the harmless animals caught come from the northern beaches.

Animal activists say this is unacceptable, but the Department of Primary Industries says there are no viable alternatives to shark nets. CAMPAIGNERS have hit out at the use of shark nets after it was revealed that less than one-tenth of creatures caught in them from Manly

to Palm Beach were the dangerous target species.

Eight target sharks were caught and found dead in nets on the northern beaches between September and April, but 75 non-target animals, mostly rays and hammerhead sharks, were also entangled.

Sharnie Connell, a Manly Sea Life Sanctuary aquarist and founder of No NSW Shark Cull, said the level of bycatch, 90 per cent, was “unacceptable”. She said that even some of the target sharks, such as the broadnose sevengill shark, posed little danger to humans.

“The shark meshing program is a placebo,” she said. “(It) only works to create an illusion of public safety. Sharks are able to swim over, under and around nets.”

However, Vic Peddemors, a senior shark researcher at the NSW Department of Primary Industries, said the nets were doing “an amazing job” and had prevented shark attacks.

The northern beaches’ bycatch makes up more than half of the non-target species caught on the stretch of coast from Stockton, near Newcastle, to South Wollongong. A total of 51 beaches have nets between spring and autumn.

Between Manly and Palm Beach, three dolphins, a whale, eight rays and four green turtles were killed by the nets, which are designed to trap sharks and stop them from forming territories at swimming beaches.

Three shortfin mako sharks, two blacktips, two dusky whalers and a bull shark – all target species – were also found dead.

Dr Peddemors said nontarget animals were freed and released alive wherever possible and that six weeks ago new pingers were installed to repel dolphins. **He said the bycatch was a “concern” but that there were no viable alternatives to nets.**

“Further consideration could be given to the feasibility of using shark enclosures for bather protection. ☐Shark enclosur
that prevents sharks from accessing an area and do not target the reduction in shark numbers or result in any bycatch ofother large species like shark nets do. Such enclosures are better suited to calmer areas although new materials that are available potentially

increase their scope of use" (Mcphee 2012).

If we introduce eco shark barriers in place of shark meshing and increase the funding to life savers and life guards to do so we can provide an even safer environment that will make it easier and more effective for lifesavers to do this job. There are secondary safety effects from having an eco-shark barrier such as keeping swimmers from drowning and keeping surfers out of designated swimming areas that will also assist the lifeguards.

The majority of the public are not in favour of killing sharks as a form of shark mitigation for beachgoer safety (conclusion from Dr Christopher Neff's Research carried out at SEA LIFE Sydney Aquarium 2013).

Taking the Bite out of Jaws
Dr Chris Neff Research conducted Oct 2013.
In the wake of yet another fatal shark bite in Australia, groundbreaking new research released today by the SEA LIFE Trust ANZ found little support for the Government on the hotly debated issue of culling sharks who have been responsible for causing injuries or death to swimmers.

The survey of 583 aquarium visitors asked participants how they thought the Government should respond to shark bites and found that despite the public's fears
87% favoured non-lethal responses
18% responding that the shark should be left alone
69% supported public education as the best method for preventing shark bites.
4% of those surveyed supported the hunting of sharks
9% supported more shark nets as a preventative measure.

Another key finding was that the least amount of "blame" for shark bites was directed at the Government with just 2-4%.
Respondents blame toward the shark also ranked low with 6-8%.

Those indicated as most responsible were either the swimmer 38-44%
Or simply no-one 33-40%

Conducted by University of Sydney Lecturer Dr Christopher Neff and funded by the SEA LIFE Trust ANZ, the survey is the first research of its kind. Dr Neff stated, "These responses show that there is little support for government measures that kill sharks and that the public does not blame governments when these tragedies occur.

Transforming shark hazard policy: Learning from ocean-users and shark encounter in Western Australia Leah Gibbs, Andrew Warren Department of Geography and Sustainable Communities and Australian Centre for Cultural Environmental Research University of Wollongong (2015)

Abstract Killing sharks is a popular strategy for reducing risk for beach-goers and ocean-users. But the effectiveness of kill-based strategies is debated and the ecological and economic costs are high. In Western Australia the state government introduced new policy in 2012 in response to shark-related fatalities, to track, catch and destroy sharks deemed to pose an 'imminent threat' to beach-goers. This paper reports on a survey of Western Australia-based ocean users ,and pursues two aims: to develop an understanding of the experiences of ocean-users in encountering sharks; and to learn about the attitudes of ocean-users towards shark hazard management. The research finds that people encounter sharks often, without harm and that most ocean-users adapt their practices in order to reduce personal risk. The majority of ocean-users oppose the kill-based elements of the newpolicy, and kill-based shark hazard management strategies more broadly. Rather, ocean-users strongly support further research and education focusing on shark behaviour and shark deterrents, and approaches that enable people to understand and accept risks associated with ocean use. These findings present opportunity to refocus debates about shark hazard management on non-lethal strategies in concert with better educating publics so they can make informed decisions about their ocean-based activities.

Latest research from Chris Neff from Ballina

WA Shark Cull History:

On the 10th of December 2013, the West Australian Government announced the details of their 'Shark Mitigation Strategy. 72 baited drum lines would be deployed off the Perth metropolitan coast and at several surf spots in the South West corner of WA. Any Bull, Tiger or White Shark that was caught on the hooks and was over 3m would be destroyed and disposed of out to sea. Any other species or any of those 3 species that was less than 3m would be released, unless they were already dead.

A protest was organised for the 4th of January, 2014 at Cottesloe Beach and an estimated 5,000 people turned up and joined the speakers in condemning the proposed action, due to start in less than a month (http://www.abc.net.au/news/2014-02-01/shark-protests-wa-catch-and-kill-perth/5232480).

Several unpleasant actions occurred, such as vandalism on the Premier's electorate office, threats to the Premier, Fisheries Officers and private contractors, resulting in increased security surrounding the Premier (http://www.watoday.com.au/wa-news/esperance-shark-attack-did-fisheries-catch-the-right-sharks-20141002-10pnm1.html).

Several hundred people attended a rally at the Department of Premier and Cabinet offices on the 13th of January, 2014.

The names of several organisations that submitted tenders to the WA Dept of Fisheries to carry out the cull off the metro coast were found out by the NoWASharkCull group and the resulting public backlash persuaded the companies to withdraw their tender bids. As a result, the State Government was forced to use Dept of Fisheries boats and crew to perform the cull activities. (http://www.abc.net.au/news/2014-01-20/plans-to-use-commerical-fishers-for-shark-cull-abandoned/5209628)

Significant social media attention started to occur, Twitter and Facebook were the key platforms, with many celebrities lending their support. These included notable contributions from Sir Richard Branson and Ricky Gervais, amongst MANY others (http://www.theguardian.com/environment/2014/jan/23/ricky-gervais-joins-celebrities-in-opposing-wa-shark-cull) The first shark was killed by the South West Contractor on the 26th of January, 2014 and was misidentified several times by the contractor and the State Government as a Bull Shark, before finally being identified as a Tiger Shark (http://www.perthnow.com.au/news/western-australia/sharks-but-zero-great-whites-caught-on-drum-lines-in-three-weeks/story-fnhocxo3-1226830508836)

It was then revealed that the SW contractor was receiving $5,000 a day for his contract and significant media attention was focused on the cost aspect over many days and as an ongoing question which endured throughout the cull. The WA Shark Cull incurred an overall cost of around $1.3m (http://www.abc.net.au/news/2014-09-11/wa-dumps-shark-drum-lines-after-epa-review/5737526)

On the 1st of Feb, 2014 another protest was organised, also at Cottesloe Beach. Approx 8,000 people turned up to this event and a total of approx 15,000 attended rallies over that weekend across Australia and New Zealand (http://www.perthnow.com.au/news/western-australia/shark-cull-protests-underway-at-beaches-across-wa-and-the-nation/story-fnhocxo3-1226815570086)

International protests started to gain ground. Premier Barnett was harassed at a protest in Capetown, South Africa, protests occurred at Australia House in London, in Argentina, in Italy, in Brussels, in Canada (http://www.watoday.com.au/wa-news/school-kids-slam-wa-shark-cull-policy-as-ridiculous-20140109-30k5a.html, https://au.news.yahoo.com/thewest/wa/a/21286174/cape-town-protest-to-wa-shark-cull/, http://www.demotix.com/news/4062804/anti-shark-cull-protest-outside-australian-embassy-london, http://www.watoday.com.au/wa-news/protest-to-save-wa-sharks-gets-international-attention-20140105-30bna.html)

Over 23,000 submissions were made to the EPA in Feb 2014, yet they decided not to assess the environmental impact (http://www.abc.net.au/news/2014-03-12/epa-rules-out-shark-cull-assessment/5315032).

Sea Shepherd took the State Government to court in late Feb, 2014, in a bid to delay the cull on the basis that the procedure was unlawful. This action ultimately failed on a point of law, but again, the media coverage was significant http://www.abc.net.au/news/2014-03-05/sea-shepherd-legal-challenge-to-wa-shark-cull-fails/5299926)

Another protest was organised, this time on the steps of Parliament House in Feb 2014, with approx 150-200 people turning up (during the working week) (http://www.abc.net.au/news/2014-02-18/shark-protest-parliament-house-wa/5267790).

Sustained monitoring of the metropolitan cull performed by the Dept of Fisheries was performed virtually every day by volunteers from Animal Amnesty, Sea Shepherd and many individuals not linked to or associated with any specific organisations. Electronic and print media from many, many countries specifically came to Perth to document the cull, speak to the people on both sides and to report back. Money for fuel, for the crews, was donated, many thousands of dollars, though several individuals funded themselves.

Media coverage between January and around May, 2014 was solid, sustained and a key factor in the success of the campaign. The 'shark issue' was the lead item, or near the lead, in virtually every news bulletin on all 4 news broadcasts nightly. Premier Barnett has publicly acknowledged that this matter and the period that it was in effect was one of the most difficult of his Government – "There was a lot of protests and maybe the Government got it wrong in some aspects, I don't deny that…" (http://www.abc.net.au/news/2015-10-01/wa-shark-strategy-well-balanced-colin-barnett/6821338)

In July, 2014, over 300 scientists from around the world signed a document calling on the State Government to stop the plans to resume the cull for a further 3 year trial (http://theconversation.com/why-were-opposing-western-australias-shark-cull-scientists-28653)

In Sept, 2014, the Environmental Protection Authority reviewed the drumline proposal for the 2014/2015 season and recommended against it proceeding. The call for submissions attracted 6,751 public submissions and two petitions with about 25,000 signatures (http://www.abc.net.au/news/2014-09-11/wa-dumps-shark-drum-lines-after-epa-review/5737526)

The Government then abandoned the plan, but 'reserved the right' to implement the 'imminent threat policy' to hunt and kill 'rogue sharks' that threatened people or 'hung around' a beach too long (http://www.watoday.com.au/wa-news/no-drum-lines-in-wa-but-sharks-could-still-be-killed-20140912-10g8uj.html).

The 'Imminent Threat Policy' then became the 'Serious Threat Policy' (http://www.watoday.com.au/wa-news/was-imminent-threat-policy-on-sharks-is-now-a-serious-threat-policy-20141223-12d1yu.html) and is still in place today. This policy was implemented several times in late 2014, including in Oct when two White Sharks were caught and killed near Esperance after an incident (http://www.watoday.com.au/wa-news/esperance-shark-attack-did-fisheries-catch-the-right-sharks-20141002-10pnm1.html). Controversy still surrounds the circumstances of the killing, with secrecy and avoidance by the Dept of Fisheries and the State Government.

172 sharks were caught on the drumlines off Perth and the south west coast. No White Sharks were caught, but 50 Tiger Sharks over 3m long were destroyed. (http://www.abc.net.au/news/2014-05-07/shark-catch-and-kill-data-released/5435682), as well as 18 other sharks. The last recorded incident involving a Tiger Shark off the WA coast was decades ago.

So, in summary, international embarrassment, massive local negative media coverage, consistent 70-80% of people surveyed not supporting the cull, massive costs and environmental vandalism.

Does New South Wales want to follow Western Australia down this road?

The **Summer of the Shark** refers to the coverage of shark attacks by American news media in the summer of 2001. The sensationalist coverage of shark attacks began in early July following the Fourth of July weekend shark attack on 8-year-old Jessie Arbogast, and continued almost unabated—despite no evidence for an actual increase in attacks—until the September 11 terrorist attacks shifted the media's attention away from beaches. The Summer of the Shark has since been remembered as an example of tabloid television perpetuating a story with no real merit beyond its ability to draw ratings https://en.wikipedia.org/wiki/Summer_of_the_Shark

Shark meshing program is detrimental to many species including sharks that are threatened with extinction.

"The use of various methods to potentially reduce the risk from shark attacks can potentially result in impacts on non-target species of conservation significance. Further, a number of shark species that pose a risk to humans are themselves of conservation significance, including one species that is listed as a vulnerable species in Australia (i.e. the white shark)" (Mcphee 2012).

Many animals caught in the nets are endangered animals with protected status or are listed as near threatened. The SMP is listed as a key threatening process as it adversely affects many threatened species and could cause non-threatened species to become threatened. Many animals caught in beach nets are now considered endangered as such the SMP is now listed as a key threatening process for the following marine animals: humpback, minke and southern right whales, Australian fur seals, dugongs, and three species of endangered marine turtles, critically endangered grey nurse sharks and vulnerable white sharks. Killing endangered animals in their ocean home for the purposes of increasing the safety to people who are visitors is unacceptable in this day and age. Environment Australia (2005) report entitled 'Death or injury to marine species following capture in beach meshing (nets) and drum lines used in shark control programs' lists some 99 species of marine animal who have

been victims of the QLD shark control program (SCP) and the NSW SMP. Of these 99 species 73% are currently listed on the ICUN redlist as near threatened, vulnerable, endangered or critically endanagered or are classified as data deficient, or not assessed yet so scientist are not able to ascertain if they too belong on the redlist. As animals and ecosystems face increasing environmental pressures, governments are obligated to ensure programs which threaten vulnerable and endangered species are replaced by less harmful measures to ensure human safety. Furthermore (SMP 2010) Although covered by the Scientific Committee, the FSC is disappointed that the marine turtles and seal caught were not identified to species, making it impossible to assess the conservation importance of these entanglements".

It is likely that the SMP was partially responsible for the decline in the number of white sharks on the East coast of NSW today "catch data are incomplete prior to 1950. Stevens and Pxton reported that more than 1000 sharks were caught in the first year of meshing, although Coppleson gave a figure of 517 sharks. In 1950 the annual catch was 354 sharks, and the average catch from 1985-1990 was 162 sharks" (Dudley 1996).

The principal threats to the white shark in Australia are outlined in the 2013 Issues Paper for the White Shark (Carcharodon carcharias) (DSEWPaC, 2013). These threats are similar to those identified in the 2002 White Shark (Carcharodon carcharias) Recovery Plan (EA, 2002) and can be summarised as: • Mortality related to being caught accidentally (bycatch) or illegally (targeted) by commercial and recreational fisheries, including issues of post release mortality. • Mortality related to shark control activities such as beach meshing or drumlining (east coast population). (taken from the white shark recovery plan). Objective 4 of the White Shark Recovery Plan: Where practicable minimise the impact of shark control activities on the white shark due to the lack of white sharks released alive from the program this has not been effected. (taken from the white shark recovery plan) . Shark control (bather protection) activities take place at popular beaches in Queensland and New South Wales and at the time of printing are being considered in Western Australia. Shark-control programs are expensive in that the equipment deployed requires regular boat-based maintenance, and they also incur associated environmental costs. Catches are not confined to dangerous

shark species, but include species that pose little threat to human safety (Cliff & Dudley, 2011). The trialling of non-lethal methods to deter sharks is included as an objective of this recovery plan and may provide a sustainable solution to the dual issues of white shark conservation and human safety. (taken from the white shark recovery plan).

The trigger points set for the SMP (define trigger points from the JMA) **Letter from the NSW Scientific Committee Appendix F** "The Committee maintains its concern with respect to the way in which trigger points have been set within the program. Trigger points should be sensitive to the population parameters of particular species, however, as they are currently set, they are likely to be too course to initiate a change in management response for species with declining or recovering populations. The Committee therefore once again recommends a reconsiderations of triggers points, taking into account population size, demographic structure, breeding biology and the cumulative effect of other anthropogenic sources of mortality affecting each non-target and threatened species that interacts with the SMP." (NSW SMP 2010).

The nets are indiscriminate killers of marine life – approximately 5% of the catch consists of the 3 most dangerous sharks (White, tiger and bull) approximately 95% are other mostly non-dangerous marine animals such as whales, turtles, dolphins, little penguins, dugongs and critically endangered grey nurse sharks, 2 species of shark should not be included in the target species list including sharks such as the broadnose seven gill shark that have never been implicated in a shark attack on a human and Mako sharks are a target species and the vast majority of cases of bites are provoked when fishermen land these animals and are subsequently bitten.

350 top marine scientists formally spoke out in opposition to the W.A. shark cull in the record breaking EPA submission (over 30,000 submissions were entered) against the W.A drumline policy in Sept 2014. The EPA assessed the culling of sharks as unacceptable and recommended against it for environmental reasons. Culling sharks in NSW has exactly the same environmental impact on protected species such as the great white shark which is listed as vulnerable on the IUCN redlist. The current manager of the shark meshing program Dr Vic Peddemors has stated publically the situation with shark decline is alarming and we

need to do everything possible to protect sharks. **http://tedxcanberra.org/talks/vic-peddemors-sharks-or-humans-who-should-be-afraid/**

The SMP has also been utililsed as a tool for scientific research into the changes in abundance of various shark and other marine animals species as a method for sampling the changes in populations over time on the NSW coast. This method has been praised for providing data that would not have otherwise been available to inform sustainable management for marine animals (Reid et al 2011). However knowing that the declines in shark and other marine animal species in both NSW and worldwide have been so severely affected by human activity primarily overfishing and with the development of new technologies to tag animals both with satellite and acoustic systems to monitor populations without killing animal surely it is time to do away with antequated methods of scientific sampling. The logic that killing animals to inform conservation initiatives and set sustainable fishing targets is no longer valid as the scientists of the world currently give an estimation at the current rates of over fishing, human population growth, pollution, climate change and other human factors unless drastic action is taken now to preserve them, the ocean ecosystems of the world will be in total collapse by 2048.

Man has killed 90% of the shark in the worlds oceans, humans currently kill 100 million sharks per year worldwide, sharks are apex predators and play a vital role in maintaining the oceans ecosystem. Without sharks the entire ocean ecosystem is predicted to collapse.

In recent research it has been discovered that (Atwood et al., 2015) "There is, however, sufficient evidence to suggest that intact predator populations are critical to maintaining or growing reserves of 'blue carbon' (carbon stored in coastal or marine ecosystems), and policy and management need to be improved to reflect these realities." New research has found that sharks play an important role in preventing climate change, warning that overfishing and culling sharks is resulting in more carbon being released from the seafloor.

has found that the culling and fishing of sharks and other large fish is leading to an overabundance of their prey, such as turtles, stingrays and crabs.

Larger numbers of these marine creatures means that vegetation which stores carbon is being eaten in greater quantities.

"Sharks, believe it or not, are helping to prevent climate change," "They are the seagrasses, the salt marshes, the mangroves and they're among the most powerful carbon sinks in the world," Dr Macreadie said.

"So they will capture and store carbon at a rate 40 times faster than tropical rainforests like the Amazon and they'll store that carbon in the ground for millennial time scales."

"There's been some 90 per cent loss of the oceans' top predators and so we've learnt this link between sharks and other top predators and the cascading effects they will have down to other animals in those ecosystems that are eating themselves out of house and home.

As animals and ecosystems fact increasing environmental pressures, governments are obligated to ensure programs which threaten vulnerable and endangered species are replaced by less harmful measures to ensure human safety.

We should be doing everything possible to protect marine ecosystems as they are more fragile than ever. We need shark control methods that make the ocean safer for people and marine animals including sharks. Shark as apex predators are vital for the health of the ocean, without sharks scientists predict that the entire ocean ecosystem will collapse. The plankton in the ocean provides up to 70% of the oxygen on the planet for this reason we need to keep our ocean ecosystems in balance. Healthy oceans need sharks!

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