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Committee Secretary
Senate Standing Committees on Environment and Communications
PO Box 6100
Parliament House
CANBERRA ACT 2600
AUSTRALIA

1 March 2017

RE: Submission to the Senate Inquiry into Shark Mitigation and Deterrent Measures

Dear Sir/Madam,

The Sunshine Coast Environment Council (SCEC) is grateful for the opportunity to provide our views on the Senate Enquiry into: *The efficacy and regulation of Shark Mitigation and Deterrent Measures*.

The Sunshine Coast Environment Council (SCEC) is a regional environmental advocacy organisation working to promote and protect the natural values of Queensland's beautiful Sunshine Coast. SCEC work with over 60 of our member groups to achieve the best possible outcomes for our region, and to ensure environmental policy is reflective of a sustainable future.

SCEC acknowledges and deeply sympathises with the trauma and tragedy to humans that shark bites cause. We would like to be explicitly clear to all readers of this submission that, as an organisation, SCEC does not value the lives of marine life over or above the lives of humans. Instead, we acknowledge the importance and value of coexisting in a healthy marine environment, and recognise the need to respect the natural habitat of marine life without the need for anthropocentrism.

As a central thread in a highly populated coastal community, SCEC acknowledges and understands the complexities surrounding human/shark encounter mitigation. We also acknowledge the government's stance to put human safety above all else, and to maintain the public perception that governments are doing all they can to keep ocean users safe. It is with this statement that SCEC wish to elaborate on how we feel governments can enhance and legitimize their efforts to ensure human safety.

At present in Queensland, shark mitigation measures are limited to outdated technologies that include baited drum lines and shark nets. SCEC are of the opinion that both measures lack integrity in regards to providing proven protection to ocean users.

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As an island nation surrounded by ocean, with 85% of our population living within 50km of the coast, increased funding channelled into apex predator research and active implementation of available non-lethal technologies is absolutely essential and paramount for the protection of both ocean users and marine life.

Regionally, our concerns surround beach goer safety, the unjust amount of innocent marine life bycatch, ecosystem health and entanglement concerns for migrating Humpback whales. SCEC propose the immediate phase out of shark mitigation equipment currently deployed along Queensland beaches. At a minimum, we seek for this to occur during Humpback whale migration season between the months of May-September.

In replacement of existing practices, SCEC advocates that the State and Federal government commence trialling alternative, non-lethal measures across all Australian coastal geographical areas as a matter of urgency. Please refer to the alternatives we have outlined in the terms of reference below.

Please do not hesitate to contact me regarding this submission. As the principal submitter, I welcome the opportunity to appear at the inquiry.

Yours Sincerely,

Leah Hays | Coordinator

PRINCIPAL SUBMITTER

Sunshine Coast Environment Council

Chad Buxton | Marine Campaigner

Sunshine Coast Environment Council



Senate Inquiry into shark mitigation and deterrent measures

Addressing Terms of Reference

In response to the efficacy and regulation of shark mitigation and deterrent measures under the terms of reference, we offer the following information:

1. Research into shark numbers, behaviour and habitat

Research in Australia

There is currently very little known about the behaviour, movement patterns, habitat requirements or breeding grounds for many shark species in Australia. Since the beginning of Queensland's Shark Control Program (SCP) in 1962, the Australian population has increased from 10.7 million to 24.5 million. Including the trend of coastal urbanisation, beach visits have increased threefold. With rapid population growth on the Sunshine Coast, this trend is likely to continue.

As a country surrounded by ocean, it seems ironic and somewhat negligent when we consider the paucity of funding dedicated to shark research. Sharks are an apex predator, and as keystone species, play a critical role in maintaining marine ecosystem health. Any attempt to manipulate normal shark behaviour should not be conducted without adequate research to inform the effects such actions could have on the marine ecosystem.

Behaviour

Of the over 450 shark species in the world, only 12 shark species have been involved in unprovoked encounters in Australia. Of those, only 3 species have been involved in fatalities: the Bull Shark (*Carcharhinus leucas*), the Tiger Shark (*Galeocerdo cuvier*) and the Great White Shark (*Carcharodon carcharias*)¹. This data makes it easy to recommend targeted research into the behaviours of these specific species.

Species-level knowledge of shark behaviours is poorly understood. However, general knowledge of shark biology and behaviours can and should be used to provide vastly improved education to the public. The last shark fatality classified as **unprovoked** in Queensland at a protected site was in 2006 where the victim was swimming in the evening, in murky water, in an ocean channel during tidal change, in an area near baited

¹ [West, JG \(2011\) Changing patterns of shark attacks in Australian waters. Marine and Freshwater Research, 2011, 62, 744–754](#)

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drum lines, and while local fishermen were cleaning caught fish and dumping the entrails into the water². All of these listed environmental conditions are known general indicators for shark attacks and as such, regardless of the presence of drumlines, education about these risks could have helped prevent this tragedy.

An equivalent analogy might be a person walking into a savannah in africa with a blindfold on, where there are lions present, and hunters are cleaning the carcass of a gazelle nearby on a raised platform. General knowledge that this would be foolhardy is intuitive and this needs to be translated to sharks through education. The public needs **accurate** general knowledge about shark behaviour and risks. It can be argued that no amount of shark prevention measures would have saved the victim in the above scenario.

Habitat

Little information is known about the specific habitat preferences, breeding grounds or movement patterns of Bull Sharks or Tiger Sharks along Queensland beaches and waterways. More research is necessary to discover which ecological factors are contributing to unprovoked encounters and to identify specific areas of risk. Innovative research such as the tagging program of Ocearch.org³ can be used to not only provide raw data of shark movements in real-time but also build public interest and awareness through emerging technology and mobile media.

2. The regulation of mitigation and deterrent measures under the *Environment Protection and Biodiversity Conservation Act 1999*, including exemptions from a controlled action under section 158

As a signatory to the *International Union for the Conservation of Nature*, under the Federal *EPBC Act 1999* and the *Nature Conservation Act 1992 Queensland*, Queensland has a responsibility to protect threatened marine species at all levels.

Grey Nurse Sharks

Focusing on Queensland Fisheries data alone, an analysis shows that 23 **Critically Endangered** Grey Nurse Sharks were killed by the program between 2004-2014⁴. It is important to note that this data doesn't include any mortality caused by commercial or recreational fishing activity. The total number of individuals on the whole of the East Coast is estimated to be less than 500 sharks and declining. There are only 5 known aggregation sites for Grey Nurse sharks in Queensland and no more than 30 individuals at any one site⁵. By any measure, the Queensland Shark Control program (SCP) is having a profound and unacceptable impact on a federally protected species.

² [GSAF Report 2006](#)

³ [Global Shark Tracker \(2017\) Ocresearch](#)

⁴ [Data relating to QLD Shark Control Program \(2015\) Shark Files QLD](#)

⁵ [Carcharias Taurus, Grey Nurse Shark - East Coast Population \(N.D\) Dept. of the Environment and Energy](#)

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By-Catch of Protected Species

Data gathered under an FOI for the entire duration of the Queensland SCP (Nov 1962 - Dec 2014) reveals 84,000 reports of animals killed under current methodologies⁶. This includes the following species with State, Federal, and/or International conservation status:

- 719 loggerhead turtles
- 33 critically endangered hawksbill turtles
- Over 5,000 turtles
- nearly 700 dugongs
- 1,014 dolphins
- 120 whales
- 442 manta rays

To be noted is that *“97 percent of sharks caught since 2001 are considered to be at some level of conservation risk [and] 89 per cent were caught in areas where no fatalities have occurred.”*⁶

It is SCEC’s view that the indiscriminate methods currently being used in the Queensland SCP present a real and significant risk to vulnerable and protected species, as well as other marine species caught as bycatch. SCEC contends that the Queensland government is not meeting its State, Federal or International obligations under existing methodologies. Unsubstantiated faith in the effectiveness of current methods or claims regarding a lack of alternatives does not justify exemptions to these obligations.

3. The range of mitigation and deterrent measures currently in use

The extent of mitigation and deterrent measures currently in use nationally include:

- Shark nets - QLD and NSW
- Drum lines - QLD and NSW
- SMART Buoys - NSW and WA
- Two Eco-shark barriers - WA

Shark Nets

Shark nets are currently employed across both QLD and NSW beaches. Nets vary from 150 metres (NSW) to 186metres (QLD) in length and are 6 metres in depth. Nets are anchored to the seafloor and are floated using buoys. Their 6 metre depth means that only a portion of the water column is netted.

On a beach kilometres long, a net only 186 metres in length does very little to stop a shark from reaching the beach. Sharks can simply swim around or underneath nets, which questions not only the economic viability of the measure, but the actual purpose of the program as a whole. Worth noting is that 40% of the species found have been caught on the beach side of the net heading back out to sea.⁷

⁶ [“Documents reveal mass capture of 84,800 marine animals in QLD” \(2015\) Sea Shepherd Conservation Organisation.](#)

⁷ [Australian Marine Conservation Society \(2014\).](#)

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Shark nets are particularly effective at being indiscriminate killers, contributing to the mortality of vast numbers of non-target marine species like turtles, rays, dolphins, whales and ecologically significant shark species. What is often not discussed is the cruel fate of these animals, which are left to starve and drown on the nets. Very small proportions are released injured with a poor prognosis of survival. Post-release mortality is not tracked or recorded.

Shark nets have been effective in **creating a false sense of security** among the public arena. This is likely due to a lack of education about how shark nets actually work. If the public were to become widely aware that nets are less than 200m in length and only 6m deep, this sense of security would likely fade.

Drumlines

Drumlines catch actively feeding sharks using a baited shark hook suspended from a large plastic float, which in turn is anchored to the sea bed. The basic premise of lethal shark control methods is that a reduction in localised shark density will lead to reduction in fatal or injurious shark interactions with humans. Given the highly migratory nature of targeted sharks, this assumption must be questioned. Additionally, drum lines target and typically remove the large, reproductive members of these shark species. Due to shark's evolved reproductive strategies such as long gestation periods, low fecundity, high mortality rates of offspring and long sexual development periods, shark species are particularly vulnerable to population impacts.

SCEC feels that **this basic premise is flawed** and does not achieve the goals of the program in keeping humans safe. Again it is necessary to point out there has been no correlation made with drum-line captures and a reduction of interactions. There are a total of 360 drum lines in Queensland and specifically 78 on the Sunshine Coast. This represents a significant cost in infrastructure maintenance and replacement for the program. SCEC also does not support a policy of 'Die-on-line', which we believe is used in Queensland for sharks on drumlines, which we view as cruel and unsustainable.

It can also be argued that bycatch caught on lethal shark control equipment may actually attract higher-order predators known to feed on dolphins and dugongs, which in turn endanger ocean users. Surfers are particularly vulnerable, as some drumlines are positioned in close proximity to popular surf breaks.

SMART Drum Lines

One hundred 'SMART Drum Lines' have recently been deployed along the NSW coastline. SMART Drum Lines involve three buoys attached to a baited hook, with the middle buoy fitted with a GPS alert system which allows recovery teams to tag and release captured sharks. This has the additional benefits of:

- Notification and release of non-target bycatch,
- Reduced removal of reproductive adults critical to healthy populations of this apex predator,
- Potential to assist in critical research needed to track and understand shark population behaviours and movement patterns.

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Although 'Smart' drum lines provide a degree of research benefit, they still harm marine life and provide the same false sense of security as standard drumlines and nets. Given the small number of sharks tagged, this cannot be considered a major solution or enhancement to ocean-user safety. Likewise, animals susceptible to stress related death like that of the Hammerhead species have a significantly reduced chance of survival once released.⁸

The Queensland Shark Control Argument

The Basic Premise that Queensland's Shark Control Program is effective is inherently flawed. A common statement used by the QLD State government to describe QLD's SCP is:

"There has not been a fatal shark attack at a patrolled Queensland beach since the introduction of shark nets and drumlines in the 1960s. Thus, it has proven to be successful in Queensland"⁹.

While the first part of the statement may be factually true, it is highly misleading, and important to consider the following:

- The fact that there have been no direct deaths on patrolled QLD beaches DOES NOT directly correlate with the presence of shark nets or drum lines. There is currently no evidence to prove that drum lines or nets are responsible for a decrease in deaths.
- Shark encounters **have not** decreased since the implementation of QLD's SCP. Shark encounter data spanning from 1900 to the present actually show an increase in non-fatal unprovoked shark encounters during the last 20 years¹⁰. This is to be expected given the population has doubled since 1962 when the SCP was introduced.
- The data does reveal a decrease in shark related fatalities since 1964, however this can be attributed to the vast improvements in medical science since 1900. What was once likely to have been fatal, is now medically manageable. A good case to illustrate this is the recent attack on Feb. 18th, 2017 of a spearfisherman who would have in the past died without modern equipment and medical treatment¹¹.

Eco Shark Barriers

Eco Shark Barriers have been successfully installed at both Coogee Beach and Sorrento Beach in Western Australia.

Eco-barriers are made from nylon, with a clip together interlocking mechanism hung between a nylon float line on the water surface and an anchored line along the seabed. Rather than being designed to catch and

⁸ [Comments by Dr. Robert Hueter, Associate Director of Research for Mote Marine Laboratory](#)

⁹ [News Article \(28 February, 2017\) Courier Mail](#)

¹⁰ [Shark Attack Data for QLD, Australia](#)

¹¹ [News Article \(19 February, 2017\) ABC News](#)

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kill sharks, the barrier encloses bathers and creates a protected area that keeps sharks out while posing no harm to non-target species.

Eco-friendly shark barriers are proving to work at **low-medium energy beaches** in Western Australia. Instead of replicating this idea in New South Wales and trialling it at suitable beaches that already have shark nets, The Department of Primary Industries and Ballina Shire Council were adamant to install these barriers at **high-energy beaches** on the North Coast of NSW instead. As expected, the technology failed as it was not engineered for high energy surf beaches.

SCEC proposes this technology be implemented in low-medium energy beaches in Queensland and NSW, with a focus on beaches within the Great Barrier Reef Marine Park and other frequented beaches protected by outer islands or reef.

4. Emerging mitigation and deterrent measures

Shark Spotters Program

A recent feasibility study into the effectiveness of the Shark Spotting Program was conducted at Wategos Beach in Byron Bay, initiated by marine conservation organisation, Sea Shepherd. The program involves positioning people (Spotters) at strategic points along the beach and coastline. Spotters are equipped with binoculars, polarized glasses and radios and are positioned at elevated sites (>40m). When a shark is spotted, a loud warning is issued which allows spotters, in conjunction with Surf-Lifesaving personnel, to ensure ocean users evacuate the water safely. Shark sightings are also provided in real time via Facebook and Twitter.

The shark spotting trial in Byron Bay was highly effective and implemented at minimal cost. During the trial there were five shark sightings compared to only one reported by authorities. Notably, the Shark Spotter method has worked effectively in South Africa for over 10 years and has been recommended as the most effective mitigation measure at a recent Shark Mitigation Workshop held at Taronga Zoo, hosted by the NSW Government.

A response sent to SCEC from Peter Clarke, Chief of Staff, Office of Bill Byrne MP on 8 February 2017 advised that a recent investigation took place into the possibility of establishing a shark spotter program in Queensland. According to Clarke, *“advice from the representatives of the South African Shark Spotter Program indicated that of the controlled beaches assessed, very few were suitable due to a lack of suitable vantage points with adequate visibility”*.

To be effective, the Shark Spotting Program requires an observation tower or vantage point of a minimum 40m elevation. **SCEC proposes this infrastructure be built to facilitate a legitimate trial of this mitigation measure across popular Queensland beaches.** Observation towers utilised for shark spotting that fall below the recommended height of 40m should not be considered a fair trial. This needs to be kept in mind

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following the NSW's government's announcement to allocate funding to construct observation towers along the NSW coastline that reach **only 3m** high.

Despite scientists recommending this program to the NSW government as the number one option for shark attack mitigation, there has not been a permanent program in place which utilises heights such as those made available at Pat Morgan Lookout at Lennox Point or the cliffs at Wategos Beach in Byron Bay. Nor has the use of dedicated signage and flags or emergency trauma training and kits been supplied at any beach in NSW.

Shark Watch NSW

Unlike the Shark Spotter program, which is a paid model, Shark Watch NSW runs entirely off volunteer support. The aim of the program is to follow and protect surfers by having teams of people operate aerial drone surveillance. This program has been supported by Byron Bay Council, although was first initiated in the Ballina LGA. SCEC commends the Northern Rivers community for initiating this program and its success to date. Challenges of the program include retention and recruitment of enough volunteers to ensure the program's ongoing effectiveness.

Clever Buoys

The Clever Buoy is an R&D program that uses a smart ocean buoy to detect the sonar signature of large swimming objects like sharks. Once a shark has been detected, the Clever Buoy sends a signal via the Optus network, which is then instantly relayed to lifeguards on the beach who can sound the alarm. The data is also shared with relevant audiences via Google+. This technology has great potential to improve detection and communication in real time. Successful trials have been conducted at Bondi Beach and Hawks Nest, NSW and at City Beach in Western Australia.

Eco Shark Barrier

Refer to Terms of Reference number 3 for description. The Eco Shark Barrier is a proven non-lethal shark encounter mitigation system for **low-medium energy beaches only**. This barrier has been successful at Coojee Beach and Sorrento Beach in Western Australia. This technology would suit popular tourist beaches in the Great Barrier Reef region protected and other patrolled beached protect by reef or islands.

Electronic Shark Deterrents

There are a number of personal electronic shark deterrents currently available with differing levels of effectiveness as analysed in the Cardno Review¹². The "Shark Shield" Personal Deterrent may be close to 100% effective according to a recent study of 322 tests,¹³ however it is not yet proven as to whether or not sharks will become accustomed to the Shield after repeated exposure. This technology is suited to swimmers, divers and surfers. New technology for surfers is now available and is based on the generating device being incorporated into the grip pad of the surfboard.

¹² [Review of bather protection technologies \(2015\) NSW Department of Primary Industries](#)

¹³ ["Great White Shark Deterrent almost 100% effective" \(2016\) Australian National Geographic online.](#)

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This method is likely to enhance personal responsibility, however SCEC recommends a subsidy programme is introduced to allow for the technology to be more broadly adopted and affordable. Alternatively, a hire system could be set up by local councils.

Aerial Surveillance

A recent trial of the Westpac-funded “Mini Ripper” drone was found to be effective. Advanced image processing technologies are used by the drone to allow for sophisticated detection methods for sharks. Ongoing research by the Sydney University of Technology is taking place to improve and fine-tune the sensor and equipment arrays for use in shark recognition and tracking.¹⁴

Emerging Technologies

SCEC believes the rapid improvement in imaging technologies, processing techniques and auto image-recognition algorithms, similar to what is being used by the COTSbot program at QUT¹⁵ to combat the Crown of Thorns Starfish represent some of the most promising emerging technologies. These technologies have the advantages of being low environmental impact and can potentially use existing infrastructure. SCEC believes that development of autonomous, early-warning detection systems should be considered high-priority and investigated further.

5. Bycatch from mitigation and deterrent measures

As previously noted bycatch (alongside marine ecosystem health and lack of legitimized human safety) is a serious concern of SCEC and the key reason we do not support the use of shark nets or drum lines. The committee will be well aware of catch statistics for the shark netting and drum line programs in Australia and will understand that a majority of animals caught are non-target species, of which majority do not survive beyond capture.

In a recent response SCEC received from the QLD Department of Fisheries (DAF), it was stated that “55 whales have been caught since year 2000, with 52 being released alive.” It is important to highlight that post-release condition is not reported and the number of mortalities following release is unknown. In 2016 alone, 7 Humpback whales were entangled in shark nets, and a further two caught in commercial fishing apparatus near Mooloolaba and the Gold Coast. **It is for this reason that SCEC advocate, at a minimum, for shark nets to be removed in Queensland during Humpback whale migration season.** It should be noted that DAF already remove nets during undesirable weather conditions, thus removing them during whale migration season should pose no additional logistical concerns. In contrast, the NSW government already remove shark nets during certain months of the year for the purpose of protecting migrating whales.

¹⁴ [‘Westpac’s Little Ripper Rescue Drone’ \(2016\) DRONE Magazine](#)

¹⁵ [QUT COTSbot program overview](#)

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Sunshine Coast Bycatch Data

Further to the Queensland SCP bycatch data discussed above in Terms of Reference number 2, SCEC analysed shark net bycatch data published on the DAF website **specific to the Sunshine Coast/Rainbow Beach area**.

In the ten year period spanning January 2007 to December 2016, 418 non-shark species were captured on shark nets in areas spanning from Bribie Island to Rainbow Beach¹⁶. Of these, 53% were found deceased, with post release mortality of the other 47% unknown. Of this statistic, the following bycatch was recorded:

- 70 dolphins (84% deceased)
- 8 Whales (all released alive)
- 6 Dugongs (100% deceased)
- 129 Turtles (10% deceased)
- 132 Rays (56% deceased)
- 73 Tuna (97% deceased)
- 12 Grey Nurse Shark (100% deceased) - data only available since 2010

Worth noting is that almost all reported Federally protected and critically endangered Grey Nurse Shark captures in QLD occurring within this period took place in Sunshine Coast waters.

6. Alternatives to currently employed mitigation and deterrent measures, including education

SCEC believes **high-priority** needs to be placed on developing effective and comprehensive education and awareness campaigns throughout the country with the aim of shifting public perception about sharks and developing personal responsibility among ocean users.

Awareness Campaigns

SCEC believes that the use of signage and a dedicated education campaign similar to the successful **'Be Croc Wise'** campaign would provide significant benefit. SCEC believes that a Shark Awareness Program would be relatively low-cost and can be modelled off the successful and proven Crocodile Awareness Program. Public awareness can and should be changed to reflect that similarly to crocodile prone areas, it isn't always appropriate to swim in 'shark habitats' under certain conditions.

Personal Responsibility

Broad and regular education campaigns focussed on personal responsibility need to encompass the following:

- The ways in which shark nets and drumlines work and don't work (i.e. catching and killing sharks rather than acting as a 'barrier fence' as is so often misunderstood by beachgoers).

¹⁶ [Shark Control Program Non Target Species Data \(2016\) Queensland Government.](#)

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- A summary of shark and bycatch catch rates.
- The inherent risk of swimming in waters inhabited by sharks, regardless of control programs.
- Encouraging beachgoers to avoid swimming:
 - during dark or twilight hours
 - in waters near effluent outlets
 - in or near river mouths after heavy rain
 - in or near congregations of baitfish
 - in areas frequented by people fishing

Changing Public Perceptions

As evidenced by the success of the Croc-Wise campaign, it is possible to change public perception, attitude and behaviours surrounding dangerous wild animals. As seen with crocodiles, sharks are an important part of the environment and ecosystem and simply removing them is not in the best public interest. It is imperative that the program focuses on fostering a respect for sharks and how we can co-exist, reducing misinformation about risk, and educating the public about best practices in regard to sharks.

Specifically, modern media plays a large role in society's perception of sharks. Shark 'attacks' make sensational news stories and are disproportionately covered in the media.

To achieve change in public perception SCEC recommends the following:

1. **Develop a dedicated education campaign** - In conjunction with signage and/or other measures to inform public about the actual risks (as opposed to perceived risks) that sharks pose to the public. Included in this should be the essential role and benefits to the marine environment that sharks play.
2. **Discourage the practice of public social media 'shark reporting'** - through Facebook or Apps such as Dorsal¹⁷. Surf Lifesaving SA has flagged this as an emerging issue of concern as reports are *'at times inaccurate or often not verified'*. This type of reporting causes *'community concern and overestimation of the danger posed by sharks'*. All reporting should come through the endorsed program methods.
3. **Encourage media to stop using emotive language** - Words used to describe encounters are often emotive. Although underreported in media, most shark encounters are incidental and don't result in death or even injury. SCEC recommends news coverage uses the word 'encounter' instead of 'attack' unless warranted (unprovoked and injurious). Similarly, the practice of using stock photos of great white sharks for any shark attack story, is irresponsible and needs to stop.
4. **Required measured responses** - Respected "Authority" organisations such as Surf Life Saving Queensland making claims about 'high-risk' areas without any scientific qualification or backing is irresponsible, potentially dictates policy and may cause significant public concern and misconception. The policies of the Shark Control Program should be driven by science, not personal opinion. Any such articles should require a measured and swift response from the Shark Control Program.

¹⁷ ['Dorsal' – community based shark alert system](#)

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Educational Research

Independent of other authorities or organisations, SCEC believes that the Shark Control Program needs to budget investment into educational research, specifically:

1. Increased research that involves innovative shark tracking programs, for example [SHARK TRACKER by OCRESEARCH.org](#)
2. Shark species identification charts that can be placed at local beaches with specific information on danger to humans.
3. Investment in engagement through **official** social media feeds which are linked to any implemented on-ground shark spotters, tracking and/or drone surveillance teams.

7. The impact of shark attacks on tourism and related industries; and any other relevant matters:

We offer that this term of reference is poorly worded. It is imperative that we also look at the impact of human activities on shark populations. A demonstrable message of activities being taken to reduce harm to sharks and the environment is likely to be well received.

Although SCEC recognise the real impacts that negative shark encounters may have on tourism and industry, SCEC contends that a lot of the impact on industry is caused by erroneous and sensationalised media reports and the lack of positive messaging. The measures listed above, particularly a dedicated educational campaign, would significantly mitigate any potential negative impacts on industry. We further suggest that a proactive and positive approach that advocates for co-existence with sharks is likely to have positive effects for industry.

Conclusion / Summary of Key Points

SCEC acknowledge that this issue presents a complex suite of problems including managing potential risk against public perception, public concern and expectation, and ultimately protecting the population from harm. It is not simply an issue of catching and/or killing shark species. Even with these considerations in mind, the worldwide plight of shark species, including the target species of this program, is troubling. Sharks are a keystone species in the oceans and play a vital role in ecosystem health. This is an issue of national concern.

There is growing evidence that the current equipment being used has severe and unintended negative consequences that are environmentally unacceptable. These include high levels of bycatch and entanglement of iconic and protected species such as turtles, dolphins and whales. There is no evidence to support the effectiveness of drum-lines or nets in mitigating shark encounters.

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Strategies to seize harm to our iconic and often protected species need to be implemented immediately. No stone should be left unturned to maintain an ineffective and deleterious status-quo. New non-lethal technologies need to be rapidly implemented while concurrently phasing out and removing current outdated equipment and methods. Management regimens need to be implemented to accommodate natural events such as annual whale migrations. It is time for Queensland and the nation to embrace innovative solutions to beach safety.

A strong emphasis needs to be placed on public education campaigns to combat misinformation and a growing unsubstantiated public perception of risk. Sensationalised media reports create a false sense of fear which needs to be dealt with swiftly and with authority. A concerted effort needs to be made to educate the actual risks of a co-shared marine environment, which will in turn help mitigate unrealistic public expectation.

Sharks are part of the ocean. The ocean is part of our Australian culture, identity and appeal. Just like koalas, kangaroos and the aquatic platypus, sharks are part of our story. Just as we cannot imagine lions and elephants being absent from the Savannah, we should similarly adopt an attitude about sharks in our coastal waters.

As a nation we need to strive for coexistence in the marine environment, while respecting that the ocean provides natural habitat to a multitude of species. Anthropocentrism of the marine environment will only contribute to ecological collapse, having a direct negative impact on human society as a whole. It is now time to adopt the non-lethal technologies available to us as a matter of urgency to avoid cumulative detrimental impacts on Australia's marine ecosystem.

Other organisations signing on to this Submission include:

