

## 2016/20: Should shark nets be deployed in the waters off northern New South Wales?

### What they said...

*'Frankly, if it's a choice between people and animals, I'm on the side of the people every time'*

Former Prime Minister, Tony Abbott, arguing in favour of shark nets

*'In the 52 years from 1950 to 2002, more than 11,500 sharks were caught and killed in the nets'*

The 2005 New South Wales Fisheries Committee report on the impact of netting on sharks

### The issue at a glance

On December 8, 2016, New South Wales Minister for Primary Industries, Niall Blair, announced the deployment of five shark nets to be trialled on the New South Wales North Coast, ahead of the school holidays.

This is a turn-around in New South Wales government policy. Though nets have been placed on Sydney beaches and at Newcastle and Wollongong, the New South Wales government had previously resisted calls to have them installed in northern New South Wales coastal waters.

The change of strategy was brought about in part by an increased number of shark attacks in the area. The nets are being set as a trial. They will be in place for six months from December 2016 and their effectiveness will be reviewed in terms of their impact on human safety and the loss of marine life they cause.

The decision has met with a mixed reaction within the coastal communities affected and has been criticised by conservationists.

### Background

(The information given below has been drawn from a number of cities.

Much of the information of shark nets was drawn from the Wikipedia entry titled 'Shark net'.

The full text of this entry can be accessed at [https://en.wikipedia.org/wiki/Shark\\_net](https://en.wikipedia.org/wiki/Shark_net)

Much of the information on shark barriers was drawn from the Wikipedia entry titled 'Shark barrier'.

The full text can be accessed at [https://en.wikipedia.org/wiki/Shark\\_barrier](https://en.wikipedia.org/wiki/Shark_barrier)

The government of Western Australia's Shark Smart internet sites outlines the beach safety and protection initiatives the government has put in place.

This information can be accessed at <http://www.sharksmart.com.au/staying-safe/beach-safety-protection-initiatives/>

A shark net is a submerged net placed around beaches to reduce shark attacks on swimmers. The majority of Shark nets used are Gillnets which is a wall of netting that hangs in the water and captures the targeted sharks by entanglement. The nets are typically 186m long, set at a depth of 6 m, have a mesh size of 500 mm and are designed to catch sharks longer than 2m in length. Shark nets are not to be confused with shark barriers.

Shark nets do not offer complete protection but work on the principle of 'fewer sharks, fewer attacks'. They reduce occurrence via shark mortality. Reducing the local shark populations is believed to reduce the chance of an attack.

Historical shark attack figures suggest that the use of shark nets and drumlines does markedly reduce the incidence of shark attack when implemented on a regular and consistent basis.

The large mesh size of the nets is designed specifically to capture sharks and prevent their escape until eventually, they drown. Due to boating activity, the nets also float 4 metres or more below the surface and do not connect with the shoreline (excluding Hong Kong's shark barrier nets) thus allowing sharks the opportunity to swim over and around nets. Shark nets can cost up to 1.4 million dollars.

### History of shark nets

Shark net meshing was first devised by the New South Wales Fisheries in 1936, after a decade and a half of shark attacks off Sydney beaches. In March 1935, for example, two people - one at North Narrabeen and one at Maroubra - were killed by great white sharks in a single week. The meshing was never designed to enclose a piece of water as barrier nets would never survive a surf zone. Instead, it was designed to catch large dangerous sharks as they swam within range of the surf. At first, the catch was huge; over 600 sharks in the first year of operation, off just a few Sydney beaches. But over time, even without adjusting for the spread of the program across almost all Sydney beaches and into Wollongong and Newcastle, the catch declined. Today's New South Wales meshing annual average catch is 143 sharks, quite a number of which are released alive.

Nets were also deployed off certain beaches off KwaZulu-Natal (KZN, formerly Natal) South Africa, in 1952.

### Shark barrier

A shark barrier (otherwise known as a 'shark-proof enclosure' or 'beach enclosure') is seabed-to-surface protective barrier that is placed around a beach to protect people from shark attacks. Often confused with shark nets, shark barriers form a fully enclosed swimming area that prevents sharks from entering (nets aim to reduce shark populations). Shark barrier design has evolved from rudimentary fencing materials to netted structures held in place with buoys and anchors. Recent designs have used plastics to increase strength, versatility and to reduce the environmental damage of bycatch.

Shark barriers work on the principle of excluding sharks from a designated swimming area. Shark barriers form an "underwater fence" from seabed-to-surface, beach-to-beach. Shark barriers are seen as a more environmentally friendly option as they largely avoid bycatch, however they cannot protect the same sized area as culling methods.

Shark barriers are not generally used on surf beaches because they usually disintegrate in the swell and so are normally constructed only around sheltered areas such as harbour beaches. It should be noted that where there are surf conditions

at Hong Kong beaches, the swell is 'typically small'. Even if they were in place at surf beaches, they would not protect surfers who go some distance from shore.

The shark nets are more suitable for surf beaches as they can be anchored beyond the deepest sandbank and can be easily taken out of the water when ever any big swell is forecast.

### Shark net and barrier use in different Australian states

#### *New South Wales*

In New South Wales, Australia, 51 beaches are netted. The nets are maintained by the New South Wales Department of Primary Industries. The nets are generally 150 metres long, 6 m wide and 'bottom-set' on the seabed in depths of 10 m. The nets can be 500 metres from the beach. The mesh is sized 50-60 centimetres. Nets are lifted every 24 to 48 hours for servicing so as to prevent rotting, to clean out debris and to remove dead sharks and other marine life. It is said that 35-50% of the sharks are entangled from the beach side. Acoustic 'pingers' have been fitted to the nets to warn off dolphins and whales and the nets are not in place in winter, the whale migration season. The Department states that the nets have 'never been regarded as a means of absolutely preventing any attacks', but help to deter sharks from establishing territories.

Shark meshing on Sydney beaches began in 1937 to reduce the numbers of sharks and thereby reduce the risk of shark attacks. Originally beaches from Palm Beach to Cronulla were meshed. In 1949 beaches in Wollongong and Newcastle were added, with Central Coast beaches added in 1987. Today 200 km of coastline are meshed. The nets are set for eight months of the year from September to April inclusive.

There have been trials of shark enclosures or barriers proposed for two northern New South Wales beaches - off Seven Mile Beach at Lennox Head and at Ballina's Lighthouse Beach. Neither proceeded because it was judged that conditions made them unworkable.

#### *Queensland*

In Queensland, Australia, drum lines are used in combination with shark nets. Queensland's Shark Control Program has been in place since the early 1960s. In Queensland's 2011/12 summer season there were 714 sharks caught, 281 above 2 metres in shark nets and drum lines. Since 1997, the program catches 500-900 sharks annually, including several shark species of conservation concern.

A fatal attack in Queensland occurred in January 2006 at Amity Point on North Stradbroke Island. The water at this location drops off to 30 metres depth, and bull sharks are known to frequent the area. Other beaches around the island were protected with drum lines at the time.

#### *Western Australia*

The Western Australian Government has funded a number of protected swimming areas, or beach enclosures to protect swimmers from sharks. Current locations include:

Old Dunsborough, City of Busselton - undertaken as a trial between January and April 2014 to test the suitability of beach enclosures in protecting swimmers from sharks. The enclosure extended about 100m from shore and ran parallel with the beach for approximately 300m. A review of the enclosure found that it was successful, providing a cost effective option for a protected swimming area with no environmental impact.

Busselton foreshore, City of Busselton - installed in November 2015.

Middleton Beach, City of Albany - installed March 2016 for a three year trial.

Sorrento Beach, City of Joondalup - due to be installed in time for the 2016/17 summer.

Quinns Beach, City of Wanneroo - due to be installed in time for the 2016/17 summer.

The City of Cockburn has also funded its own enclosure at Coogee Beach near Fremantle. The enclosure is deployed year round on a three year trial basis to 2017.

Following seven fatalities in the three years from 2010 - 2013, a limited number of drum lines were deployed for a three month trial period between the end of January and April 2014.

There have been no permanent drum lines deployed off the Western Australian coast since 30 April 2014.

### Recent shark attacks in New South Wales

#### *2015*

February 6, Newcastle (Merewether Beach) - Male bodysurfer bitten on foot by wobbegong shark. Minor lacerations.

February 8, Ballina (Seven Mile Beach) - White pointer attacks surfer Jabez Reitman, 35, about 60m from shore. Chunk of flesh ripped from his back and lacerations to hip.

February 9, Ballina (Shelly Beach) - Japanese surfer Tadashi Nakahara dies after 4m great white severs both legs in an attack close to shore.

May 3, Taree (Saltwater Beach) - Local man treated for serious wounds to his left arm and right hand after attempting to fight off a white pointer about 60m from shore.

July 1, Yamba (Flat Rock) - Great white severs nerves and tendons in male surfer's hand after attacking as he paddled out through the breakers.

July 2, Ballina (Lighthouse Beach) - 32-year-old bodyboarder Mathew Lee mauled by 4m great white. Serious injuries to both his legs but both limbs saved in emergency surgery.

July 31, Evans Head (Main Beach) - Surfer Craig Ison, 52, attacked by a white pointer during morning surf, suffering serious wounds to his leg and arm.

August 22, Port Macquarie (Lighthouse Beach) - Bodyboarder Dale Carr loses 2.5l of blood after being mauled by 3m great white about 150m from shore.

September 4, Forster (Black Head Beach) - White pointer mauls surf-skier David Quinlivan, 65, as he paddles offshore. Serious wounds to his left ankle.

November 10 - Ballina (Lighthouse Beach) - Champion junior surfer Sam Morgan, 20, seriously injured after 3m bull shark

mauls his left thigh.

## 2016

March 30 - Kiama (Bombo Beach) - Surfer Brett Connellan, 23, loses 70% of his upper left leg and suffers deep wounds to his left hand in a white pointer attack about 100m from shore.

September 26 - Ballina (Lighthouse Beach) - 17-year-old surfer rushed to hospital with serious leg wounds after being mauled shortly before 9am.

### Apparent increase in unprovoked shark attacks

In the 1990s, the average number of unprovoked attacks in Australia was 6.5 per year. That figure jumped to 13 per year over the last decade. In 2015 alone there were 22 unprovoked attacks, including one fatality and 13 injuries.

### **Internet information**

On January 8, 2017, Perth Now published a report titled 'Shark nets have changed Perth's iconic beach culture'. Despite the headline, the article actually deals with the operation of beach enclosures or barriers at a number of Perth beaches'.

The full text can be accessed at <http://www.perthnow.com.au/news/western-australia/shark-nets-have-changed-perths-iconic-beach-culture/news-story/bae5f9cfac183cf2e7b99a02d6018958>

On December 9, 2016, The Conversation published a comment by Nathan Hart, Associate Professor of Biological Sciences, Macquarie University and Charlie Huvencers, Senior lecturer, Flinders University.

The article is titled 'Not just nets: how to stop shark attacks without killing sharks'. It considers a number of alternatives to shark nets as means of reducing shark attacks.

The full text can be accessed at <https://theconversation.com/not-just-nets-how-to-stop-shark-attacks-without-killing-sharks-69400>

In December, 2016, the News South Wales Department of Primary Industries posted an entry on its Internet site titled 'North Coast shark net trial'.

In addition to announcing the trial, the entry supplies answers to twenty commonly asked questions about the nature of the trial.

The full entry can be accessed at <http://www.dpi.nsw.gov.au/fishing/sharks/management/shark-net-trial>

On December 5, 2016, The Australian published the first of a series of six articles by Fred Pawle on shark attacks in New South Wales. The introduction to the series can be accessed at <http://www.theaustralian.com.au/news/nation/the-fatal-shore/news-story/caf0b0f552a0d66c6f2a25bd1df267>

The first episode of the series, titled 'The Anger', also published on December 5, 2016, details the reactions of people in coastal communities such as Ballina who are angry that the government has not supplied them with effective shark protection.

The full text can be accessed at <http://www.theaustralian.com.au/national-affairs/state-politics/ballina-lennox-byron-shark-crisis/news-story/70abd956652869c53a7d1d464ce971c6>

On December 6, 2016, The Australian published the second episode of the series, titled 'The Backlash' which presents the attitude of many people living in communities such as Byron Bay, who are opposed to the introduction of shark nets in their waters.

The full text can be accessed at <http://www.theaustralian.com.au/national-affairs/state-politics/byron-bay-and-ballina-at-loggerheads-over-shark-nets/news-story/cee59328a28cb68a3750c935db582c04>

On December 7, 2016, The Australian published the third episode of the series, titled 'The Victims' which details the injuries and attitudes of a number of those who have suffered shark attacks and of those who know and have assisted the victims.

The full text can be accessed at <http://www.theaustralian.com.au/national-affairs/state-politics/ballina-cop-ron-lindsay-on-sharks-crime-and-saltwater-sanity/news-story/edd06aa53b935c22de03e175ad3182be>

December 8, 2016, The Australian published the fourth episode of the series, titled 'The Losses' which describes the economic impact on coastal communities in northern New South Wales of the recent spate of shark attacks.

The full text can be accessed at <http://www.theaustralian.com.au/national-affairs/state-politics/ballina-businesses-feel-the-pain-of-shark-attacks/news-story/55a17e0d9109390cf1bb44edef052453>

December 9, 2016, The Australian published the fifth episode of the series, titled 'The Unsettled Science' which looks at disputing views on the numbers of sharks in the areas and the likelihood of shark attacks.

The full text can be accessed at <http://www.theaustralian.com.au/news/the-unsettled-science/news-story/32f35524ea12cb0752bfef4097c7c946>

December 10, 2016, The Australian published the sixth episode of the series, titled 'The Solution' This is primarily an interview with the New South Wales premier, Mike Baird, about the factors which led his government to install shark nets in northern New South Wales.

The full text can be accessed at <http://www.theaustralian.com.au/news/surfing-the-nets/news-story/8baf447e464c9c13c558676c15b6133d>

On October 13, 2016, The Conversation published a comment by Leah Gibbs, Senior Lecturer in Geography, University of Wollongong titled 'More shark nets for NSW: why haven't we learned from WA's cull?'

The comment is critical of the recent decision to extend the use of shark nets.

The full text of this point of view can be accessed at <https://theconversation.com/more-shark-nets-for-nsw-why-havent-we-learned-from-was-cull-66985>

On September 28, 2016, The Daily Telegraph published a report titled 'Shark attack: It's people vs. predator in NSW's great white crisis'

The article reports on the most recent shark attack at Ballina and details the views of those who want more extreme control measures put in place.

The full text of the report can be accessed at <http://www.dailytelegraph.com.au/news/nsw/shark-attack-its-people-vs-predator-in-nsws-great-white-crisis/news-story/93475f5ce2f32490b43d0f4d8c5b499a>

On September 27, 2016, The Australian published a report titled 'Cooper Allen reveals injuries; Tony Abbott calls for shark fishing'

The report shows a photograph of the injuries of the most recent shark attack victim in the waters off Ballina; it also details support for the introduction of nets and other more extreme measures of shark control.

The full text can be accessed at <http://www.theaustralian.com.au/news/cooper-allen-reveals-injuries-tony-abbott-calls-for-shark-fishing/news-story/9aa6728be82a45e4a7008090667b1235>

On August 28, 2016, ABC News ran a report titled 'Shark nets indiscriminately killing marine life already inside protected area, video suggests'

The report looks at calls to remove shark nets along the Queensland coast after a video report from the Australian Institute of marine Rescues suggests they are ineffective and harmful to marine life.

The full text can be found at <http://www.abc.net.au/news/2016-08-28/shark-nets-killing-marine-life-already-inside-protected-areas/7792336>

On February 8, 2016, ABC News ran a report titled 'Shark nets "do nothing": 50 years of data "shows chances of attack unaffected by mitigation programs".'

The report focuses on data analysis which suggests that shark nets do not reduce the likelihood of shark attacks. The report includes comments from experts who dispute this claim.

The full report can be accessed at <http://www.abc.net.au/news/2016-02-08/shark-nets-in-nsw-beaches-do-not-reduce-attacks:-research/7145560>

On January 6, 2016, Choice magazine published a report titled 'Do shark repellents work?'

The overall view appears to be that all devices have significant limitations. The full text of this report can be accessed at <https://www.choice.com.au/health-and-body/diet-and-fitness/surfing-and-snowboarding/articles/shark-repellents-review#power>

In October, 2015, the New South Wales Department of primary Industry released a report titled 'Shark Deterrents and Detectors: Review of Bather Protection Technologies'

The review concluded that none of the devices seemed sufficiently reliable to be trialled without further refinements.

The full text of the review can be accessed at [http://www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0020/621407/cardno-review-of-bather-protection-technologies.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0020/621407/cardno-review-of-bather-protection-technologies.pdf)

On October 10, 2015, The Ethics Centre published an opinion piece by Clive Phillips, Chair of Animal Welfare and Director of the Centre for Animal Welfare Ethics at the University of Queensland.

The comment is titled 'Flaky arguments for shark culling lack bite' and attempts to counter the main arguments offered to justify shark culling.

The full text of the argument can be accessed at <http://www.ethics.org.au/on-ethics/blog/october-2015/flaky-arguments-for-shark-culling-lack-bite>

On October 2, 2015, The Guardian published a comment by shark author, James Woodford, titled 'There is deep unease about sharks in northern New South Wales. Here are some facts to keep in mind'

Woodford argues that there is much misinformation about supposed increases in shark numbers.

The full text of this piece can be accessed at <https://www.theguardian.com/environment/2015/oct/02/could-big-game-fishing-solve-the-problem-of-shark-attacks>

On September 29, 2015, ABC News ran a report titled 'Shark experts consider deterrence devices to trial in NSW'

The report looks at measures being considered to offer protection to beachgoers in northern New South Wales.

The full text can be accessed at <http://www.abc.net.au/worldtoday/content/2015/s4321558.htm>

On August 13, 2015, The Daily Telegraph published a comment by Laura Banks titled 'When sharks are eating people, it's time to cull'.

The opinion piece argues for human beings' right to enter the water as they choose and to kill sharks as they pose a threat to human life.

The full text can be accessed at <http://www.dailytelegraph.com.au/news/opinion/when-sharks-are-eating-people-its-time-to-cull/news-story/551f8bdf16fd15cac41ca778452e50a9>

On August 5, 2015, the radical conservation group, Sea Shepherd, published a report by Natalie Banks titled 'Proof that New South Wales nets only provide a false sense of security'

The report details research findings treating the number of shark attacks at net-protected New South Wales beaches. The full text of this report can be accessed at <https://www.seashepherd.org.au/news-and-commentary/commentary/proof-that-new-south-wales-nets-only-provide-a-false-sense-of-security.html>

On November 24, 2014, the Southern Courier published a report titled 'Shark Nets Don't Work' by Shae McDonald. The report cites a number of authorities with reservations about the effectiveness of shark nets.

The full text of the report can be accessed at <http://www.sealifetrust.org.au/wp-content/uploads/2014/11/Shark-Nets-Dont-Work-Southern-Courier.pdf>

On April 14, 2014, The Guardian published a comment by Christopher Neff. Dr Neff, a Lecturer in Public Policy in the Department of Government and International Relations at the University of Sydney. Dr Neff disputes claims that nets have succeeded in keeping Sydney beaches safe and that politicians are pressured by the electorate to install nets.

The full text of the article can be accessed at <https://www.theguardian.com/commentisfree/2014/apr/14/the-politics-of-shark-attacks-time-for-some-myth-busting>

On August 22, 2010, The Sydney Morning Herald ran an article titled 'Nets are a dead loss for sea life'

The article detailed the results of a 20-survey of the marine life caught in New South Wales shark nets.

The full text of the article can be accessed at <http://www.smh.com.au/environment/conservation/nets-are-a-dead-loss-for-sea-life-20100821-139pg.html>

The radical conservation group, Sea Shepherd, has a section of its Internet site given over to promoting shark conservation.

The group outlines the extent of the threat human activities pose to sharks and the importance of sharks' continued survival to marine ecosystems and the ecological wellbeing of the planet as a whole.

The full text can be accessed at <https://www.seashepherd.org.au/apex-harmony/overview/shark-importance.html>

Sea Life Trust has published a report by Alice Forrest, an aquarist with Manly Sea Life Sanctuary. The report is titled 'Shark nets in Australia - what are they and how do they work?'

It describes how shark nets work and is critical of their operation.

The report can be accessed at <http://www.sealifetrust.org.au/news/latest/shark-nets-australia-work>

In 2005 Fisheries Scientific Committee reviewed the impact on marine life of New South Wales shark nets and recommended they be discontinued.

Their final recommendation and the reasons for it can be accessed at

[http://www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0003/636537/FR24-shark-meshing.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0003/636537/FR24-shark-meshing.pdf)

### **Arguments against shark nets being used along the northern New South Wales coast**

1. Sharks are a necessary apex predator threatened by human activities

The importance of sharks to the ecosystems within which they live has been pointed out repeatedly by marine scientists, conservationists and others.

Caitlin Weatherstone, an environmental scientist living in Byron Bay, has stated, 'I would root for a healthy ocean environment. And with a healthy ocean ecosystem, we need sharks. Sharks are the top predator, and they control everything underneath them. If we lose that predator, the whole ecosystem basically crumbles.'

The radical conservation group, Sea Shepherd, has noted, 'Around the world sharks are in big trouble, with over 90% of the world's sharks wiped out through fishing, cruel shark fining and shark mitigation strategies. As a result, between 70 and 100 million sharks die a year. That's over 10,000 every hour...'

A number of scientific studies have demonstrated that the depletion of sharks results in the loss of commercially important fish and shellfish species down the food chain, including key fisheries such as tuna that maintain the health of coral reefs. As important apex predators, sharks have shaped marine life in the oceans for over 450 million years and are essential to the health of our oceans, and ultimately to the survival of humankind.'

A similar point has been made by the Western Australian Department of Fisheries which states on its Internet site that 'Sharks play an important role in maintaining balanced ecosystems, controlling prey populations and removing weak animals while healthy ones survive to reproduce...The presence of many species of shark as 'apex predators' - occupying the top level of the food chain - is an indication of a healthy marine environment.'

The same site notes the reason for attempting to protect sharks. 'Concerns about shark stocks in the 1990s led to big reductions in fishing effort and catches in WA's shark fishery. Only a few commercial fisheries are authorised to keep their shark and ray catches for sale and these fisheries operate under strict controls to manage their catch levels.'

The white shark, whale shark, northern river shark (also known as the northern spartooth shark), grey nurse shark - and all sawfish, which are related to sharks - are protected from all types of fishing. The White Shark (or the Great White Shark) is listed as 'rare or likely to become extinct' and in 2002, the Australian Government developed a Recovery Plan to promote the conservation of this species.

In 2009, all species of whaler sharks were given extra protection under recreational fishing rules through the re-introduction of a maximum size limit in the West Coast and South Coast Bioregions. The new arrangements complement similar rules in the commercial fisheries.'

NSW Department of Primary Industries chief shark researcher Vic Peddemors has claimed that 'there were probably 30,000 white sharks (off Australia's coast) before we arrived on this continent, and that it was stable at that level for thousands of generations.' Professor Peddemors has further stated, 'The east coast population is likely to be less than 6000 animals.'

In terms of the impact that netting can have on shark populations, the numbers caught in the well-established netting program already operating in New South Wales suggest the impact is significant.

In 2005 the New South Wales Fisheries Committee stated, 'In the 52 years from 1950 to 2002, more than 11,500 sharks were caught and killed in the nets, with annual shark deaths during this period ranging from 648 to 69 sharks. Due to increased numbers and sizes of nets, as well as setting times, direct comparisons with recent years are not possible. Nevertheless, death rates have dramatically decreased in the last 30 years and the annual capture of all sharks from all 49 beaches including those in Newcastle, Central Coast, and Wollongong has been below 200 in all but one year since 1983. The annual catch has ranged from 69 to 158 sharks in the last 5 years to 2001/02, with the last kill of 69 being the lowest ever recorded.'

After analysing the data on shark kills in New South Wales beach nets between 1950 and 2002, the Committee concluded, 'The current shark meshing program in New South Wales waters' adversely affects two or more threatened species, populations or ecological communities and could cause species, populations or ecological communities that are not threatened to become threatened.'

The Committee then recommended that the current shark netting program be discontinued.

## 2. Nets endanger many other species as by-catch

One of the major objections to shark nets is that they do not discriminate, that is, they kill not only sharks but a wide range of other sea creatures. This collateral damage is referred to as 'by-catch'. There are even those who have claimed that human lives have been lost because human beings have become snared in shark nets.

Alice Forrest, an aquarist with Manly Sea Life Sanctuary has stated, 'Over 15,000 animals have been killed by these nets in NSW - this includes about 100 species such as endangered turtles, dolphins, dugongs, rays, seabirds, harmless sharks and rays. The nets have even killed orcas, little penguins and people - that's right, shark nets have killed two people.'

A similar point was made in 2010 after a survey of the impact of shark nets on marine species in New South Wales since 1990. It was found that almost 4000 sea creatures have been caught in shark nets lining New South Wales beaches over the 20 years that the survey covered. Of the official count of 3944 creatures trapped, about 60 per cent were sharks, though less than 4 per cent were considered 'target' species (that is, sharks particularly harmful to humans). The list of trapped species included 1269 stingrays, 52 dolphins, 47 turtles, six whales, four seals, a penguin and a dugong. A report released in 2008 confirms these findings. It states, 'from September 1990 to April 2008, there were 3,259 marine animals caught within the shark nets that were considered by-catch. These include 1,292 hammerhead sharks, 1,269 stingrays, 259 angel sharks, 107 port jacksons, 52 dolphins, 47 turtles, 40 thresher sharks, 15 grey nurse sharks (critically endangered and have been protected in New South Wales since 1984), six whales, four seals (vulnerable and protected), a penguin (protected) and a dugong (protected). In addition 100 White Sharks (vulnerable and a protected species since 1999) were caught in these years.'

Commenting on this survey data, radical conservation group Sea Shepherd, has stated, 'Despite accounting for a third of the catch, hammerhead sharks are not a target species and have not been implicated in a single attack in New South Wales since 1900.'

The Humane Society International's director, Michael Kennedy, has claimed the public would be shocked to know how many animals were killed in the nets.

Mr Kennedy has stated, 'We know from our own research and from the government's research that these nets do kill a large amount of threatened marine animals. It is very hard to justify their continued use.'

Queenscliff Surf Club coach, Damien Daley, has claimed that the consensus among surf lifesavers is that the nets are environmentally damaging. Mr Daley has stated, 'When I dive, 50 per cent of the animals caught in the nets are not sharks.'

## 3. Nets are not an effective means of protecting beachgoers

Those who object to the use of shark nets often contend that they are not an effective means of protecting beachgoers. One of the reasons said to make shark nets ineffective is that they are not a total barrier. Sharks can swim above, below or around them. It has been noted that many of the sharks snared in the nets have approached them from the beach side. On August 5, 2015, the radical conservation group Sea Shepherd published a data analysis produced by Natalie Banks of the effectiveness of New South Wales shark nets.

The survey states, 'In the 23 years, since September 1992, there has been 21 unwanted shark encounters at netted beaches in NSW; almost one per year. This doesn't include the death of a 15-year old boy who drowned after being caught in a shark net at Shoal Bay in March 2007. It does however include the shark incident on 12 February 2009 at Bondi Beach when Glen Orgias (33) lost his left hand after being bitten by a 2.5m white shark while surfing and the severe bite that Andrew Lindop (15) received by a suspected 2.6m white shark at Avalon Beach on 1 March 2009.'

On April 14, 2014, The Guardian published a comment by Christopher Neff. Dr Neff, a Lecturer in Public Policy in the Department of Government and International Relations at the University of Sydney, also disputes claims that nets had succeeded in keeping Sydney beaches safe.

Dr Neff has noted that although there have been no fatal shark attacks on Sydney beaches since 1937, there have been 14 non-fatal ones. Dr Neff concludes, 'So the real line should read that shark nets are effective at shark bite prevention, except for the 14 times there have been shark bite incidents. No fatalities, yes and gratefully so. But the legend of shark nets' success is more complicated than what the standard line suggests.'

Opponents of shark nets claim that they have not saved lives and that the reduction in fatalities after shark attacks is attributable to the improved assistance which victims receive once they have been attacked.

Associate Professor Laurie Laurenson of Deakin University's School of Life and Environmental Sciences has stated, 'If you look at how far medical intervention has come since the 1960s, they are very, very, very good at it.

The reason there've been no fatalities is because of earlier responders having sufficient training, having the right equipment, knowing exactly what they want to do.

They get there early. They get people to the hospitals quickly.'

4. Human beings have no automatic right to access coastal waters and should regulate their behaviour in that environment. It has been claimed that human beings have no absolute right of access to marine environments and that when they do enter coastal waters it is the human being's responsibility to manage the risk by behaving cautiously.

Clive Phillips, Chair of Animal Welfare and Director of the Centre for Animal Welfare Ethics at the University of Queensland, has paraphrased the argument of those who challenge human beings' supposed right to unimpeded access to the oceans. Mr Phillips states, 'Sharks have a right to occupy the territory in which they evolved over millions of years. And this right trumps humans' alleged right to utilise territory they are ill-suited to and gain little significant benefit from.'

In a petition given to the Western Australian premier in 2013, opposing the introduction of shark culling in that state, it was claimed, 'When we use the ocean, we are entering a shark's natural habitat and we should be responsible for our own safety and awareness.'

Claudette Petkovic, who works as a research assistant to a marine scientist, and who is currently in Byron Bay, has stated, 'As someone who goes into the water every single day, you have to accept the fact that you're in their territory. If they mistake you for something, obviously it sucks. It's not ideal. You don't want to be attacked or mistaken for their food but it does happen and that's not the shark's fault. It's not your fault either but you have to accept it.'

This perspective is promoted in other jurisdictions. The United States National Oceanic and Atmospheric Administration has produced a public education fact sheet and webpage titled 'It's the ocean, not a swimming pool'. The fact sheet claims, 'The ocean is wild, and other potential dangers exist there -- like getting caught in a rip tide, getting knocked over by a large wave, getting stung by a jellyfish, cutting a foot on a shell, or getting bitten by a shark - that do not exist in a swimming pool...'

Remember that when you swim in the ocean you are a guest in a wild habitat and you should respect that habitat and its creatures, much like you would if you were camping at Glacier National Park where wild grizzly bears live. And just like putting on sunscreen when swimming in a swimming pool and storing food wisely when camping in grizzly bear territory, taking precautions to ensure your health and safety in the ocean is the best way to enjoy your summer beach vacation.' Among the recommendations offered in Australia that it is claimed help to reduce the risk of humans being injured or killed by sharks are: stay out of the water if sharks have been sighted in the area; stay close to shore (within 30m of the water's edge); don't go in the water alone (stay in groups); avoid water temperatures lower than 22C; avoid water depths of greater than 5m when swimming or surfing; avoid swimming after heavy storms, or in low light conditions (dusk and dawn) and avoid swimming if there are seals, dolphins, whales or baitfish nearby.

Relatedly, it has been claimed that human beings currently pose a far greater threat to sharks than sharks do to human life. IFL Science notes 'Humans kill an astonishing number of sharks every year. Various species are the victims of culling in attempts to make beaches safer, bycatch by commercial fishing vessels, trophy catches and the practice of finning for food...'

The journal Marine Policy attempted to calculate the exploitation rates of sharks.... Using data on shark catches, discards and mortality rates worldwide, the researchers estimated that approximately 100 million sharks are killed per year by humans.'

Conversely, Greenpeace estimates that for every human being killed by a shark, human beings kill one million sharks. While some 100 million sharks die as a result of human actions each year; sharks kill approximately ten people a year.

5. There are other means of protecting beaches that cause less environmental damage

Opponents of shark nets argue that there is a range of mitigation measures that can be employed to reduce the likelihood of shark attack, without using shark nets.

One of the principal means of reducing human shark risk in the water is to educate people in safe behaviour. There are many such programs available. One is conducted by the Western Australian Department of Fisheries which, using the acronym SMART, recommends people:

'Search [sharksmart.com.au](http://sharksmart.com.au) before heading to the beach in order to be aware of the most recent shark sightings.

Make sure you swim between the flags or stay close to shore and avoid deep channels or areas with steep drop-offs nearby.

Avoid hazardous waters. Never swim in places where human or animal waste enters the water. Avoid disposing of fish waste near swimming beaches and don't remain in the water with bleeding wounds. If spear fishing, be sure to remove speared fish from the water quickly.

Recognise the danger signs. Keep away from large schools of fish, seals or wildlife behaving erratically.

Take a mate with you. Swim, dive or surf with a buddy.'

There are a number of other public safety measures governments can fund in addition to individual safety devices, especially shark repellents, which beachgoers can purchase to help promote their personal safety.

On December 9, 2016, The Conversation published a comment by Nathan Hart, Associate Professor of Biological Sciences, Macquarie University and Charlie Huveneers, Senior lecturer, Flinders University. The authors recommend a range of measures to promote safety in the water.

Hart and Huveneers state, 'As well as enhancing public awareness of attack risk, a range of shark attack mitigation measures have become available. In addition to shark nets, shark-proof barriers and early warning systems can be used as large-scale initiatives to reduce shark attack risks at popular beaches.'

The authors also refer to 'a proliferation of personal shark deterrent technologies... Currently available devices include those that produce strong electrical or magnetic fields, those that produce a repulsive light, sound or odour, and those that reduce the visibility of the wearer to sharks.'

### **Arguments in favour of shark nets being used along the northern New South Wales coast**

1. There is public concern in northern New South Wales regarding the possibility of injury or death from shark attack. There were 36 unprovoked shark bites recorded in Australia in 2015 and 2016, three of them - one in Ballina and two in Western Australia - were fatal. In 2015 and 2016 there were (including the fatal attack in Ballina) 27 shark encounters along the New South Wales coast, ranging from involvements as harmless as a 71 year old man being knocked off a surf ski

through to serious injury and the one fatality. Concern is particularly acute along the northern New South Wales coast, where there have been 13 shark attacks on humans in the past two years, one, as noted, fatal.

This spate of attacks in the Ballina-Byron Bay area has provoked acute community concern. One resident whose daughter recently lost the use of her thumb after a shark attack has commented, 'Places like this, until two years ago, were always really happy places - if there was swell everyone's got a big smile on their face. Now there's lots of children around the area that aren't surfing anymore because of the stress and the anxiety that they're feeling.'

One woman, who moved with her husband into the area in 2014, has stated, 'It's actually terrifying. You're just on tenterhooks and you're really, really nervous. Before, I wouldn't have any problems with him [her husband] going surfing for three or four hours. But now I'm like, "an hour, thanks, that'll do." It's too much.'

The resident went on to note, 'It is the pinnacle of the Australian lifestyle. For us, that's our life. I've got three sons and we're at the beach at eight o'clock in the morning, sometimes we're at the beach three times a day.'

Now it's become a dangerous sport, which is so weird because it's always been such a free way, such a way of self-expression, of enjoying life, just, you know, living in the sun and the ocean. Hopefully, the government's going to do as much as they can to protect us.'

Mr Richard Beckers, a surf shop owner in Ballina, who had a friend and employee attacked by a shark in 2015, has stated, '99 per cent of Ballina residents want nets and other mitigation strategies. Everyone knows someone that's been attacked, so it's a personal thing. When it affects you personally, it's significant.'

Another local surfer has explained the effect the attacks have had on the whole community. He has stated, 'It's not just the people who are attacked. It's the community who are trying to enjoy their lives, the families, the paramedics, the cops, everybody is impacted. Some of these guys are trained for this sort of thing and have to take time off because it's just too gruesome to have to deal with it.'

Some critics have argued that where human lives are put at risk, they should take precedence over animal life.

Former Prime Minister Tony Abbott has stated, 'I don't know why we don't have a commercial shark fishery up there because, frankly, if it's a choice between people and animals, I'm on the side of the people every time.'

## 2. Shark nets have proved an effective means of protecting beaches from sharks

Defenders of shark nets point to their apparent success in New South Wales and other areas. The use of shark nets and drum lines along the Queensland coast is generally claimed to have been effective. In a background and opinion piece published in the Australian on December 5, 2015, Fred Pawle stated, 'Every popular beach all the way to Cairns has either nets or drumlines, or both. (Nets, which are 150m-200m long and 6m deep with a 500mm mesh, do not enclose a beach; rather, they trap any large marine creatures that happen to swim through them. Drumlines are large baited hooks suspended from a buoy. Both nets and drumlines are checked every few days by contractors.) In 54 years, there has been only one fatal attack at a protected beach in Queensland.'

Referring to the situation in some other coastal regions in New South Wales, Pawle notes, 'Nets were installed in Sydney in 1936, and later extended to beaches off Wollongong and Newcastle. New South Wales too has only ever had one fatality at a protected beach.'

The New South Wales department of Primary Industries offered similar data as a justification for the decision to trial nets along the northern New South Wales coast. Its Internet site states, 'There has been only one fatality at a netted beach between Newcastle and Wollongong in the last 70 years. The frequency of shark interactions with people dropped considerably after nets were installed around Sydney and in Queensland - compared to what it had been previously.'

The effectiveness of shark nets is supported by Professor Vic Peddemors, shark ecologist with the New South Wales Department of Primary Industries. Professor Peddemors has stated, 'I can definitely put my hand on my heart, I can say that I believe that shark nets work, and I believe you are a lot safer on a netted beach, not only because of the nets, but also because they are at patrolled beaches.'

The CSIRO has explained the manner in which shark nets works as a protection against shark attacks. The CSIRO Internet site states, 'In New South Wales, shark nets are set on 51 beaches spanning 200 kilometres of coastline. The nets are 150 metres in length, 6m high and are set in 10-12m of water approx 500m from, and parallel to, the shore. In general one to two nets may be set at each beach.'

Shark nets are most effective at reducing the abundance of resident sharks as these sharks have a higher chance of encountering the net over time.

They do not prevent sharks from entering or leaving the beach; they operate by entangling sharks that swim into them by chance.'

Supporters of shark nets in northern New South Wales have used the nets' apparent success along other coastal regions to argue for their extension. Former Prime Minister, Tony Abbott, has stated, 'I'm lucky to surf at Sydney beaches and the beaches in Sydney, Newcastle and Wollongong since the 1940s have been protected by mesh. If it's good enough for Sydney, Newcastle and Wollongong, I don't know why it's not good enough for the New South Wales north coast.'

Queensland premier, Annastacia Palaszczuk, has noted that the shark nets employed along the Queensland coast have proved more effective than the protection methods offered those in northern new South Wales.

Ms Palaszczuk has stated, 'We have proven that since the 1960s, there has only been one shark fatality and that was off Amity point.'

But our beaches have been protected extensively because of the use of shark nets and drumlines. I'm more than happy to work with Mike Baird. We can extend them down to NSW, and I'm very happy to offer this assistance to the Premier.'

## 3. The increase in shark attacks has been detrimental to the economies of northern New South Wales coastal towns

The impact of shark attacks on the economies of coastal communities can be very damaging. Coastal communities rely heavily on tourist- and recreation-based industries. Access to the ocean is a primary element in these industries. Boat sale and hire, aquatic equipment, accommodation, cafes, restaurants and gift shops all depend on people who come to the region to recreate.

In an opinion piece published in The daily Telegraph on August 13, 2015, Laura Banks claimed, 'Tourism is slowing. The



people are not coming. Surfers are not surfing. If this continues into summer, the seaside towns of Lennox Head and Evans Head, even Ballina, will be no more.'

Richard Beckers, a surf shop owner in Ballina, has noted that when a former employee of his was injured through a shark attack in 2015, the shop's takings were reduced by about \$200,000. He notes that surf accessories, which account for 30 per cent of his sales, dropped 90 per cent. Sales of body boards - a popular Christmas present - dropped from 200 to 20. For each of the past 18 months he has recorded lower sales than the previous corresponding month.

David Loosemore who owns a resort at Shelly beach has noted a similar impact. He has stated, 'There's a massive downturn. Parents don't want to send their children to an area where there's sharks. You've got a large group of people that don't come to the area any more. It's had a big turn for the whole community, not just me. It has a social impact as well. It affects the community all the way through.'

An attack at Shelly Beach in October led to a rush of cancellations at the Grandview Apartments in Ballina. The final week of the October school holidays, traditionally one of the busiest times of the year, was down 80 per cent.

Grandview manager Peter Campbell has claimed that about 20 apartments were usually let to tourists, but only three or four were occupied after the attack.

Mr Campbell stated, 'People aren't looking here because they are concerned, and there have been multiple cancellations, particularly after the last shark attack. Most of the ones who turn up ask if it's safe to swim. Something that would resolve this would be an ocean pool ... they keep talking about nets but they are still not there and people aren't booking.'

In September, 2015, Neil Kennedy of the Lennox Chamber of Commerce stated, 'The school holidays, the caravan parks are full. What we definitely don't want is for a perception that people shouldn't come here because of danger.'

#### 4. Other forms of shark protection have not proved effective

Several of the personalised forms of shark protection available to swimmers and surfers have been judged ineffective. Shark Shield is the only electrical repellent on the market that has been independently shown to be effective at deterring sharks from biting. The electrical field is created by a two-metre cord that trails behind the user. For divers and swimmers, the device is wrapped around the ankle, while for surfers and kayaks there's a different model that requires installation directly onto a board.

The most recent study of the device by scientists at the University of Western Australia (UWA) found it prevented great whites and tiger sharks from attacking most of the time, but it was not always effective. An earlier study by the South Australian Research and Development Institute also found the device was effective in deterring great whites, but noted it did not 'deter or repel this species in all situations, nor did it repel all individuals'.

Though there have been no independent studies on the effectiveness of magnetic shark repellent devices, research into using magnets to repel sharks from commercial fishing lines has generally been inconclusive as to their effectiveness. Sprays intended to deter shark have generally been considered impractical as their potential effectiveness is dependent on the human being fearful of attack being in a position to use them and even then their effectiveness is uncertain.

In January 2016 Choice magazine gave the following advice regarding personal shark repellents, 'Be aware of their limitations - many devices haven't undergone independent testing, and no device will protect you in all circumstances.'

There are also concerns about the effectiveness of large-scale deterrent devices, such as sonic emitters, which have been suggested as ways of reducing shark risks over large areas.

A review prepared for the New South Wales Department of Primary Industries and released in October, 2015, has concluded 'Although most of the shark deterrents that operate at large-scales have potential for whole-of-beach protection we consider that they require further refinement before short-listing for potential trial at New South Wales beaches.'

In 2015 the New South Wales government introduced a \$16 million shark strategy which dismissed the option of netting on north coast beaches in favour of surveillance, tagging, smart drum lines, drones and listening stations.

A number of commentators have been critical of the initiatives. Reporter and commentator for The Australian, Fred Pawle, has stated, 'Most of this year was spent implementing various aspects of the government's much-flaunted \$16 million shark mitigation strategy. Attempts to install barrier nets to enclose sections of Lennox and Lighthouse beach were abandoned, as surfers predicted they would be, when it became apparent they could not withstand even moderate ocean swells.'

Pawle further noted, 'The Department of Primary Industries has hooked more than 60 great white sharks, mostly off Ballina, using smart drumlines. The drumline alerts a crew, who then rush out to insert an acoustic tag either into its fin or surgically into its belly.' Pawle then reported that when he personally sought information about the whereabouts of a tagged shark, none was supplied. As one of the purposes of tagging is to supply information to beachgoers about the location of sharks, Pawle was sceptical about the effectiveness of the program.

There has also been criticism of the shark spotting program which has volunteers sitting on elevated towers looking for sharks. Lennox Head Surf Life Saving Club president, Geoff Harris, has expressed doubts, stating, 'I don't care how good these shark spotters are, they are not going to see anything in that water. Sharks are not surface swimmers.'

#### 5. Care is being taken to reduce the ecological impact of the newly installed shark nets

The New South Wales Department of primary Industries has taken steps to ensure that the ecological impact of the shark nets installed on northern New South Wales beaches will be kept as low as possible.

The Department has stated, 'Nets will be fitted with whale alarms and dolphin pingers to deter marine mammals. While the Sydney nets are checked at least once every 72 hours, it is proposed that more frequent checking will be done for the North Coast trial. The exact regime will be informed by community feedback. It is also proposed to trial the use of SMART automatic alert devices so that a meshing contractor can be notified and respond quickly to release any trapped animals.'

The Department is aware of the fact that different species will be affected differently, however, it is doing all it can to assist those species it can. It has stated, 'Deterrent devices will be used to deter dolphins from the immediate area of the net. However, if dolphins or green turtles are inadvertently caught, it is unlikely they would survive for more than 30 minutes. Loggerhead and Leatherback turtles are likely to be able to survive for considerably longer than this.'

The trial will start in December 2016 and run for six months. This period will avoid most of the whale migration time.'

With regard to particular shark species, the Department has noted, 'It is possible that some Grey Nurse Sharks might be

entangled during the course of the trial. These sharks generally have a relatively good survival rate in the Sydney meshing program and can usually be released alive.

Whenever safe and practical to do so, potentially dangerous White, Bull and Tiger sharks will be relocated further out to sea before being released.

The DPI will trial running the nets together with SMART drumlines which allow captured sharks to be tagged, relocated and released.'

The Department has also indicated that the trial will be conducted with a view to discovering potential ecological impact and that this will be one of the factors that will determine whether the use of nets continues.

The Department has stated, 'Two types of information will be used to evaluate the trial. First, how effective are the nets at catching target sharks with minimal impact on other marine animals. Second, how acceptable the approach is to the community in terms of reducing risk of shark bites.'

### Further implications

Shark attacks and shark conservation are issues that arouse strong feelings. Recently there had appeared to be a growing accommodation within the Australian community to the view that sharks need to be accepted as a natural hazard to swimmers and surfers in Australian waters and that what is required are measures that reduce the risk humans face, without endangering the sharks' survival. Culls, baited drumlines and shark nets were falling into disfavour.

The use of baited drumlines for a three-month period in Western Australian waters in 2014 was a response to seven fatalities in the three years from 2010 - 2013. Despite the level of public distress these deaths caused, the deployment of drumlines met with widespread public disapproval and the lines were removed at the end of the three months and have not been used since. However, popular attitudes vary.

The recent deployment of shark nets in northern New South Wales is also in response to a spike in shark attacks in the area which has led to vocal demands for their introduction. A number of media outlets, including *The Australian*, appear to have run campaigns critical of the New South Wales premier, Mike Baird, and his initial refusal to install nets in the area.

Interestingly, now the nets have been deployed, though they have been presented as a trial measure to operate for only six months, the premier, when pushed as to whether the nets would stay, has stated, 'I'm not going to give you a position now but obviously we haven't put them in with the intention of trying to take them away.'

The position is a particularly complex one in New South Wales. The state has employed shark nets on the popular beaches of Sydney, Newcastle and Wollongong beginning with their use to protect Sydney beaches in 1937. Though their effectiveness is disputed within the scientific community, they are popularly believed to have largely prevented fatal shark attacks in the areas where they have been deployed. In addition to this, shark nets are also used along the Queensland coast. Thus, those on the northern New South Wales coast are able to see themselves as denied the protection being offered to beachgoers to the north and the south of them. Some clearly found it particularly galling that others in their own state could swim on netted beaches, where theirs were being neglected. It was possible to construct what was happening as part of the supposed favouring of the city over the bush and Baird was presented as a metropolitan politician out of touch with the needs of rural constituencies. (This was an accusation to which the premier was particularly vulnerable given his decision to ban greyhound racing and then his reversal of that decision, in part in the face of rural opposition.)

The change of policy re shark mitigation in northern New South Wales seems part of a larger pattern of populist responses to issues, perhaps sparked by Australian government's concern about international developments such as Brexit and the election of Donald Trump in the United States. Positions which seem to cater to the views of urban, educated elites are coming to be seen as a political liability.

### Newspaper items used in the compilation of this issue outline

AUST, October 1, 2016, page 19, comment by Fred Pawle, 'Stand-off in the shark safety debate'. [↗](#)

AUST, September 29, 2016, page 13, letter, 'The ocean shoreline is a playground for humans, not sharks'. [↗](#)

AUST, September 27, 2016, page 15, editorial, 'It's a question of leadership'. [↗](#)

**The Australian, December 2, 2016**, background by Fred Pawle, *The Fatal Shore* [↗](#)

**The Australian, December 6, 2016**, background by Fred Pawle, *The Fatal Shore, Episode 2: The backlash* [↗](#)

**The Australian, December 5, 2016**, background by Fred Pawle, *Episode 3: The victims* [↗](#)

**The Conversation, December 7, 2016**, comment by James Smith, *It will take years to know whether New South Wales' shark nets are working* [↗](#)

**The Australian, December 8, 2016**, background by Fred Pawle, *The Fatal Shore, Episode 4: The Losses* [↗](#)

**The Australian, December 9, 2016**, news item by Fred Pawle, *Abandoned shark barrier cost \$576,000* [↗](#)

**The Australian, December 9, 2016**, background by Fred Pawle, *The Fatal Shore: Episode 5: Unsettled Science* [↗](#)

**The Australian, December 10, 2016**, background by Fred Pawle, *The Fatal Shore: Episode 6: Surfing the nets* [↗](#)