



Department of
Primary Industries

SHARKSMART

NSW SHARK MANAGEMENT STRATEGY

Snapshot of Key Results



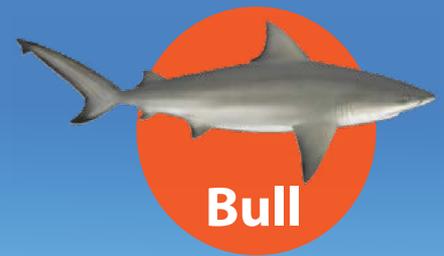
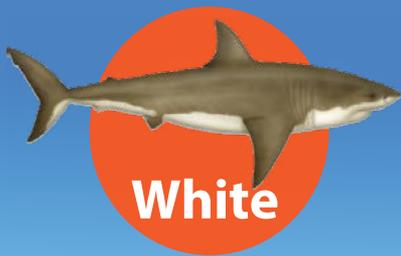
sharksmart.nsw.gov.au

NSW SHARK MANAGEMENT STRATEGY

Snapshot of Key Results

The NSW Government's world first, five-year \$16 million Shark Management Strategy trialed a suite of shark mitigation technologies and helped to increase knowledge about the movement and ecology of White, Tiger, and Bull Sharks.

The Strategy complemented the NSW Government's other existing shark mitigation and awareness programs, including the Shark Meshing (Bather Protection) Program (SMP).



COMMUNITY ENGAGEMENT AND
SOCIAL RESEARCH

CLEVER BUOY™

VR4G SHARK
LISTENING STATIONS

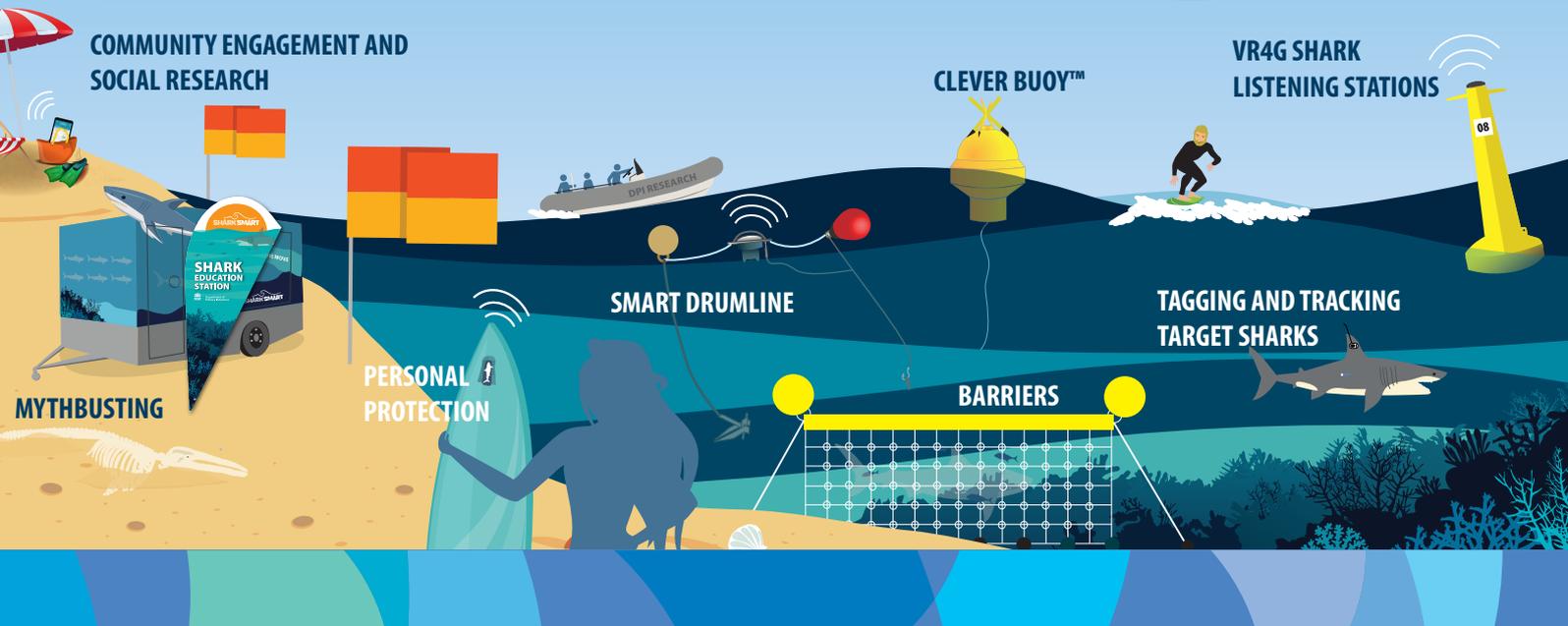
SMART DRUMLINE

TAGGING AND TRACKING
TARGET SHARKS

PERSONAL
PROTECTION

BARRIERS

MYTHBUSTING



Shark Mitigation Technology

Testing and trialling a suite of measures to increase protection for beachgoers

The key results of the technologies trialled under the NSW Shark Management Strategy include:



AERIAL SURVEILLANCE

Drones

MOST
PREFERRED



DPI's research showed drones are the most effective shark detection and surveillance tool for NSW ocean beaches. The NSW Government partnered with Surf Life Saving NSW (SLSNSW) to trial deploying drones at many beaches across the State. As well as conducting shark surveillance flights, drones can be used to communicate with water users through sirens and a loudspeaker. Beach authorities can also use drones to identify swimmers in distress, enabling lifeguards and volunteer lifesavers to save more lives.

Key Results

DPI's partnership with SLS NSW has now established NSW as leaders in embedding drones as a critical tool to keep ocean beaches as safer places for water users.

Community surveys show that using drones for shark surveillance is the most supported and preferred mitigation approach across all coastal regions and was seen as the future of not just shark mitigation, but beach and ocean safety. It was valued for its versatility, non-invasive targeted coverage over individual beaches and ability to hover over sharks and water users in distress. Overall, it was considered excellent value for money and more environmentally friendly than helicopters.



AERIAL SURVEILLANCE

Helicopters

Helicopters were trialled across the NSW coastline for surveillance at both patrolled and unpatrolled beaches. They can cover large areas, with no impacts on marine animals. If a potentially dangerous shark is identified close to swimmers or surfers, helicopters can communicate with water users through sirens and a loudspeaker and are also able to herd the shark back out to sea.

Surveillance can also be impacted by visibility due to weather and ocean conditions.

Key Results

Data show that approximately 15% of all marine wildlife sightings are of potentially dangerous sharks such as White, Tiger or Bull Sharks or other large but unidentified sharks. Approximately 10% of target species sightings led to beach evacuations.

While helicopter surveillance is generally supported across all coastal regions, they are seen as being more expensive and less environmentally friendly than drones, and generally viewed as not as effective due to the short time spent on each beach.





IN - WATER MANAGEMENT

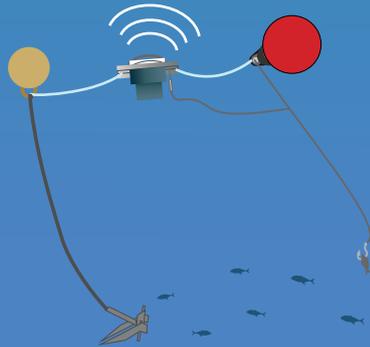
SMART Drumlines



MOST PREFERRED

Shark Management Alert in Real Time (SMART) drumlines are both a shark mitigation and research tool. SMART drumlines consist of an anchor, two buoys and a satellite-linked GPS communications unit attached to a hook baited with one sea mullet. When a shark takes the bait, the boat crew are alerted, and the team responds immediately to relocate, tag, and release the shark or other marine animal 1km offshore.

Trials were undertaken at multiple locations on the NSW coast to assess how the technology works in different coastal areas and operating environments.



Key Results

SMART drumlines remove the immediate risk by intercepting the sharks beyond the surf break, with boat crew relocating the shark 1km offshore. After relocation, most sharks tend to remain offshore for a period of time.

Using SMART drumlines, DPI now leads one of the largest shark tagging programs in the world, to build more knowledge about the movements and ecology of target sharks.

Community surveys show that many people in the NSW community think SMART drumlines are better than traditional shark nets because they catch more target sharks, release and relocate sharks and have less bycatch. There are some concerns that SMART drumline baits attract sharks and should not be located near swimmers, and around the welfare of sharks during the catch, tag and release process.



IN - WATER MANAGEMENT

Clever Buoy™

The Clever Buoy™ uses sonar technology and specialised video software to detect sharks and transmit information to beach authorities. The Clever Buoy™ was installed by Shark Mitigation Systems at Hawks Nest, NSW in November 2016. Overall, the 2016 field trial showed that Clever Buoy™ can detect and identify White Sharks as well as estimate their length.

Key Results

The greatest distance from the Clever Buoy™ that a White Shark was detected, and confirmed by Baited Remote Underwater Video Stations (BRUVS) was 28 m. Further refinement and field testing is required to improve the range of Clever Buoy™.



IN - WATER MANAGEMENT

Barriers

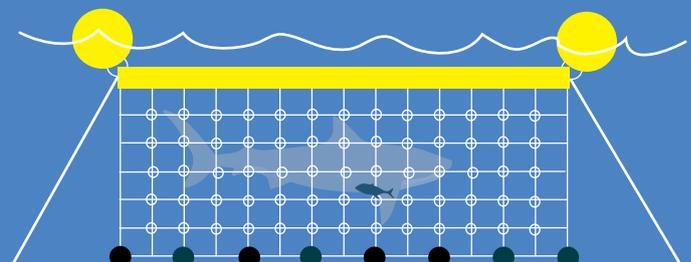
Shark barriers are a physical barrier that separates sharks from beachgoers. Unlike the Shark Meshing Program nets, barriers form a fully enclosed swimming area like an 'underwater fence' which goes from the seabed to the surface.

For the first time on Australia's East Coast, NSW DPI aimed to trial two shark barriers in 2016 to provide an enclosed shark-free area for beachgoers.

The objectives of the 3-year barrier trials were to determine if the barriers could be safely and effectively installed and survive the eastern coastal environment.

Key Results

As the barriers could not be installed effectively and safely, both trials were discontinued. Currently available shark barrier products are only suitable for NSW estuaries or highly sheltered coastlines.





IN - WATER MANAGEMENT

Personal Protection

Personal shark deterrents can be worn by an individual or attached to surfboards. There are different types of devices including electric, magnetic, chemical and visual deterrents designed to disrupt sharks' sensors to deter them from approaching.



Key Results

Five commercially available products were independently tested to determine if they deter sharks.

Testing of the products confirmed that whilst none are 100% effective, one product, the Ocean Guardian Freedom + Surf, reduced interactions with White Sharks by 56%, and the other products reduced interactions by less than 15%.

As none of the devices tested provided guaranteed protection from White sharks, further research is required.

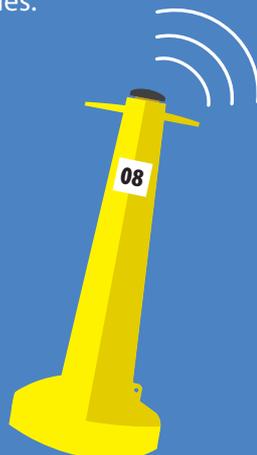


TECHNOLOGY & MONITORING

VR4G Shark Listening Stations

MOST
PREFERRED

Shark listening stations have been deployed at 21 locations on the NSW Coast from Kingscliff to Merimbula, to provide real-time alerts of tagged sharks to beachgoers via the SharkSmart app. When a tagged shark swims within 500 metres of a listening station, an instant alert is sent to the SharkSmart App, website and Twitter feed @NSWSharkSmart providing real-time updates to the public and beach authorities.



Key Results

This information has been used by researchers and the public to improve the knowledge on where and when these sharks are along our coast, via the SharkSmart App and Twitter.

DPI has provided more than 50,000 alerts from listening stations to the public to inform where and when tagged sharks are along our coast.

Community surveys show that listening stations are valued for real-time detection of tagged sharks and provide valuable contributions to the tracking of sharks for research. However, there are concerns around their effectiveness being dependent on the number of tagged sharks, and only being helpful for those at a beach with a listening station.

Tagging and Tracking Target Sharks

Increasing knowledge about the movement and ecology of White, Bull and Tiger Sharks

DPI has tagged and monitored over 700 White, Bull and Tiger sharks to learn more about how these animals are using NSW coastal waters. SMART drumlines and shark listening stations are critical components of the tagging and tracking program.



Key Results

Analysis on tagged sharks shows that most juvenile White Sharks move north along the NSW coast during winter and spring, when the waters are cooler in northern NSW. They then head south over summer and autumn to track cooler waters in the southern states. That's not to say there are no sharks in NSW waters in summer or autumn – tagging results show they can be anywhere at any time along our coast.

DPI contributed to an analysis of shark bites in Australia and it appears that White Shark bites usually happen when there's a patch of cold water close to the coast surrounded by warm water. This suggests White Sharks move closer to the coast to be in the cooler water.

Overall, the tagging and tracking program has showed that White Sharks travel significant distances, rather than staying close to one location; some tagged sharks travel as far as New Zealand or Western Australia, whilst in summer, more Bull and Tiger sharks use NSW waters, as they move south with the East Australian Current.

Community Engagement and Social Research

DPI has shared the journey of the Strategy through strong community and stakeholder engagement. Education programs and messaging around how to be SharkSmart has led to a better awareness of sharks and their behaviour to help everyone enjoy the beach and reduce the risk of a shark encounter.



Key results

The SharkSmart App has been downloaded over 70,000 times allowing beach goers to stay updated when a tagged shark is detected.

Surveys have provided the NSW Government with information on community sentiment about sharks, and shark bite mitigation preferences.

Non-invasive approaches such as aerial surveillance were supported and preferred over invasive and/or lethal approaches such as shark nets. Drone surveillance was highly supported (and preferred over helicopters).

Community education was seen as an important part of reducing the risk of shark bites to help people take personal responsibility for their own safety.

For more information on the Shark Management Strategy, visit sharksmart.nsw.gov.au