



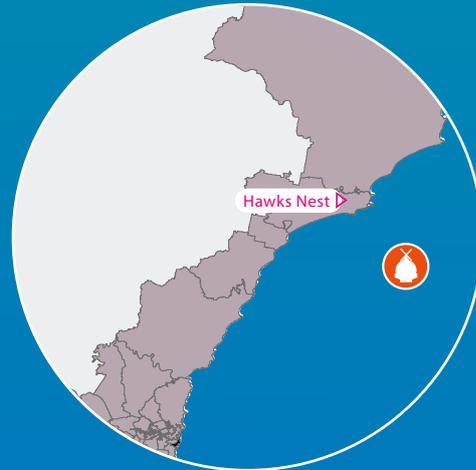
Clever Buoy™

Key results from NSW field trial in November 2016

'Clever Buoy™' was developed by Smart Marine Systems (formerly Shark Mitigation Systems) to use sonar technology and specialised video software to detect sharks and transmit critical information to beach authorities. Sonar transducers, like giant headlights pointed out to sea, are mounted on the sea floor and coupled with detection software scans for sharks and marine life. The unit is deployed beyond the surf zone and searches for distinctive movement patterns made by sharks.

NSW DPI tested Clever Buoy™ in collaboration with the University of Technology Sydney and Shark Mitigation Systems. The trial evaluated if Clever Buoy™ could detect White sharks and estimate their length. This also included testing the range at which sharks could be detected.

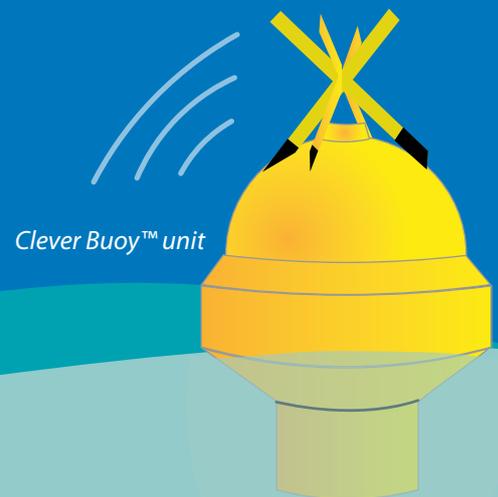
Overall, the 2016 field trial showed that Clever Buoy™ can detect and identify White Sharks as well as estimate their length. However, because of the way the sonar was arranged, sharks that were further than 46m from the unit were not detected. Further refinement and field testing is required to improve the range of Clever Buoy™.



Trial Location: Hawks Nest Beach, Port Stephens NSW

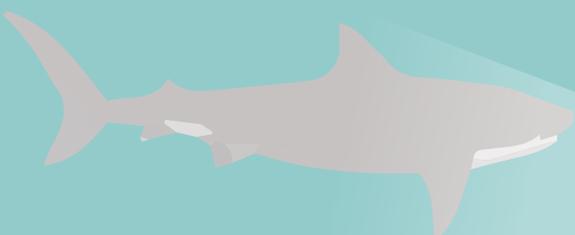
Hawks Nest Beach in Port Stephens was chosen as the trial location as it is a nursery for juvenile White Sharks.

The Clever Buoy™ was installed by Shark Mitigation Systems in November 2016 for 13 days. The unit was installed around 800 m offshore, in about 9 m of water.



Clever Buoy™ unit

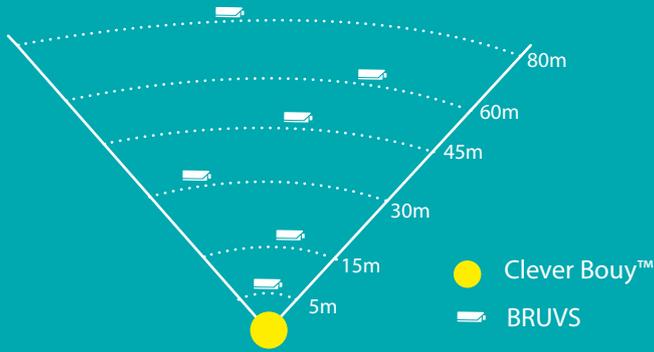
Sonar detects objects under water by sending out sound pulses and measuring their return after being reflected. Whales and bats also use this method called echolocation



Six baited remote underwater video systems (BRUVS) were positioned within the sonar's theoretical 80-m line of sight (between 5 – 86 m from the Clever Buoy™). Marine life captured on the BRUVS was compared to the information received from the Clever Buoy™ to verify that the sonar

system had accurately detected sharks and other large marine animals. The BRUVS recorded White Sharks on 41 occasions and at all distances from the Clever Buoy™. None of the White Sharks recorded by the BRUVS between 42-86 m from the Clever Buoy™ were detected by Clever Buoy™. The greatest distance from Clever Buoy™ that a White Shark was detected by the Clever Buoy™, and confirmed by BRUVS, was 28 m.

After the trial, Shark Mitigation Systems reviewed the set-up of Clever Buoy™ and indicated that the angle and calibration of the sonar was not correct for the shallower water depth at Hawks Nest. This trial highlighted that the calibration of the sonar for the seabed profile and water depth is an essential part of using this technology.



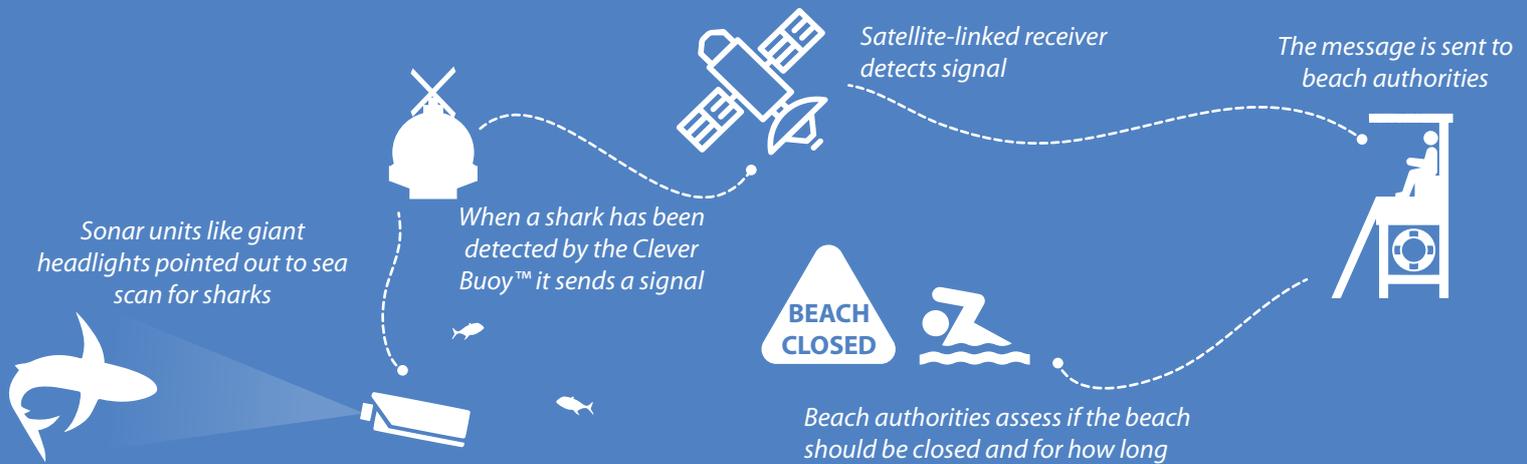
BENEFITS

- Marine life would not be harmed
- Beach authorities could receive real time alerts about the presence of sharks

CONSIDERATIONS

- The Clever Buoy™ trialled by NSW DPI was only suitable for patrolled beaches due to the communications systems
- Multiple units and additional beach-based communications infrastructure may be required to provide adequate coverage

HOW CLEVER BUOY™ WORKS



WHAT THE COMMUNITY THINKS



No specific community sentiment analysis was completed on the Clever Buoy™

Sonar transducers are mounted on the sea floor and scan for sharks

