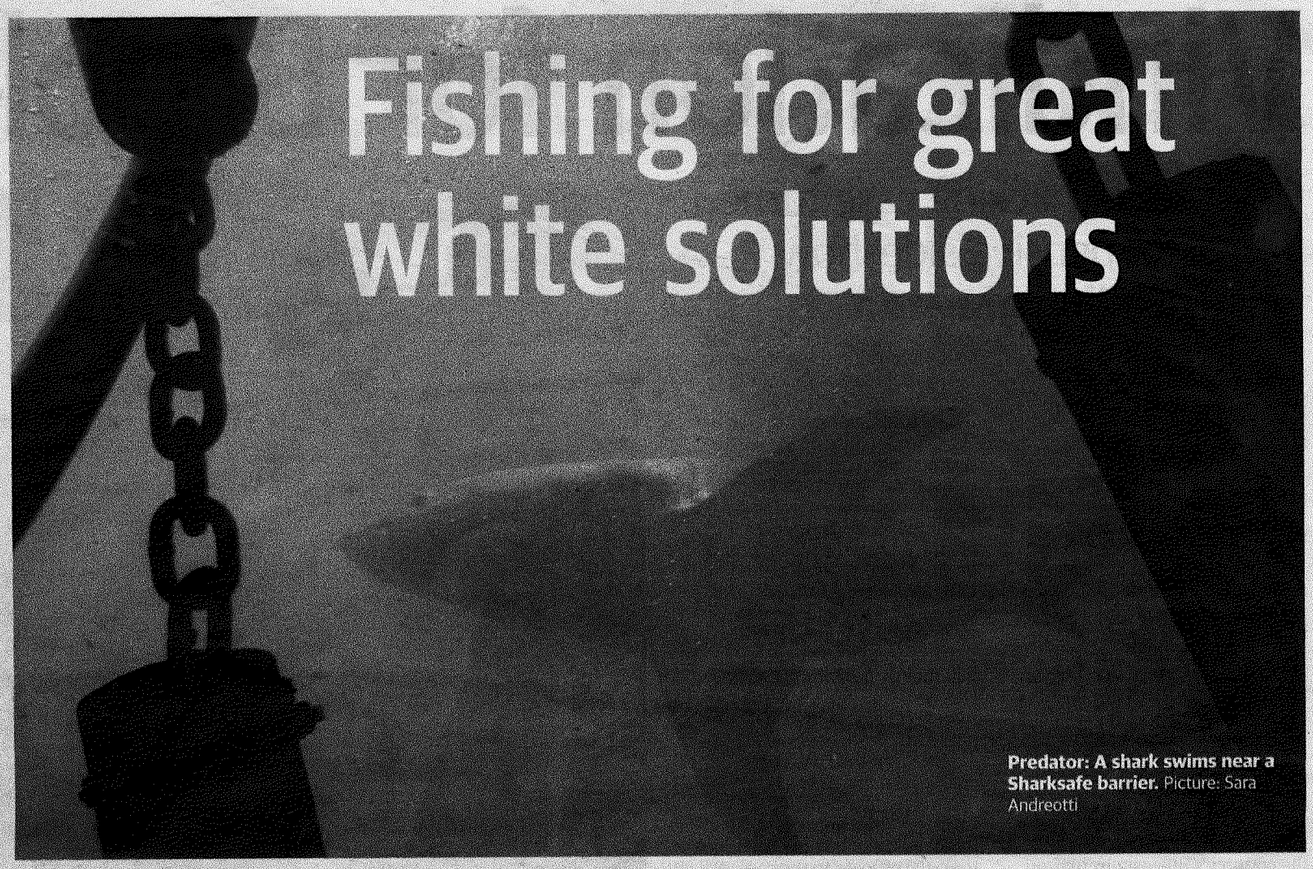
Fishing for great white solutions



Predator: A shark swims near a Sharksafe barrier. Picture: Sara Andreotti

UWA scientists in shark haven trying to solve a WA problem

Angela Pownall

With winter's arrival, hundreds of fur seal pups venture for the first time from their island refuge in Mossel Bay, South Africa, into the ocean to forage.

Waiting in the water for these easy targets are many great white sharks, which have congregated in the Southern Cape bay to hunt the 5000-strong seal colony.

And waiting for the great whites are a group of scientists from the University of WA, who have gone to South Africa to test potential shark attack deterrents being developed in WA.

Five fatal shark attacks in 10 months off WA in 2011-12 shocked Australia and made headlines globally.

It prompted the WA Government to announce $646,000 of funding for two years of shark deterrent research in December 2012.

Less than a year later, surfer Chris Boyd was killed by a great white shark off Gracetown.

The 35-year-old died on the same day internationally renowned chefs and thousands of people were in the Margaret River wine region for the Gourmet Escape food festival.

This latest death spurred the Barnett Government to go further than ever before, killing sharks caught with baited hooks on drum lines off WA beaches this year.

While controversy over the drum lines has been raging, Professor Shaun Collin and his UWA colleagues have been working on non-lethal ways to keep sharks and humans apart in the ocean.

The difficulty in encountering white sharks in WA led the scientists to Mossel Bay, which has the most accessible great white population in the world, to test their ideas in a real ocean environment.

Speaking to *Agenda* in South Africa, Professor Collin revealed what they knew about sharks and deterrents and what they hoped to learn from the South African great whites.

Based on their research, the team is testing potential deterrents involving bubbles, sound and lights, as well as electrical shark deterrents which are on the market.

So far, the scientists have had the most success with bubbles and "some quite encouraging results" with smaller sharks not passing through bubble curtains.

Searching: Shaun Collin and his UWA colleagues have been trying to solve our shark problem.

> We might be able to change the human enough not to give off the same signals.
>
> **Professor Shaun Collin**

Bubbles have been used in aquariums to deter sharks from entering a section of a tank, Professor Collin said.

The sight of bubbles is thought to spook sharks. Also, bubbles make a noise sharks do not like and they interfere with a shark's lateral line, a sense which detects water disturbances.

"The lateral line system is a series of little hair cells so they pick up really minute changes in water movement," Professor Collin said.

"A big intense bubble is going to disturb those hair cells really well, so bubbles are attacking three of the known senses; vision, lateral line and hearing.

"That might actually be one of the ones we pursue if it's more successful."

Bubbles could be used in two ways. First, a big compressor could fire off a stream of bubbles around a bay or beach if a big shark is detected. Second, a diver could use a bubble device to pump out controlled and directed intense bubbles.

The scientists are also testing the South African great whites' reactions to two different sounds — the call of an orca, one of few known great white predators, and an artificial sound on varying frequencies.

"It's nothing that's familiar to any human," Professor Collin said. "The idea is that changing frequencies may, a bit like the bubbles, reduce the amount of habituation or the ability of the animals to get used to it. It will be quite loud close up. Sound travels extremely well underwater so it will be heard some distance away.

"It's so artificial to the animal in the natural environment, it will somehow be disarmed or deterred."

It's a bit of a fishing expedition as sharks' auditory ability is largely a mystery, with only a few scientific papers written on the subject. The scientists are hopeful they have at least identified the frequency range of a great white shark's hearing.

A beacon covered with extremely bright flashing lights will also be shown to the sharks to monitor their reactions.

"It's like being caught in the beam of a headlight of a car. It's a fright, something they would not ordinarily be exposed to, plus we know a lot about their visual system and how sensitive they are to light," Professor Collin said.

With receptors in their eyes that only work in dim light, the sharks' retinas will be bleached and temporarily blinded by this flashing bright light, hopefully stalling or deterring them.

"We're trying to deter them long enough for people to do something about where they are in proximity to a large shark," Professor Collin said.

But the results with the flashing beacon have so far been ambiguous.

"The biggest thing that's holding us up is the interaction with the sharks. There are just not enough of them around," he said.

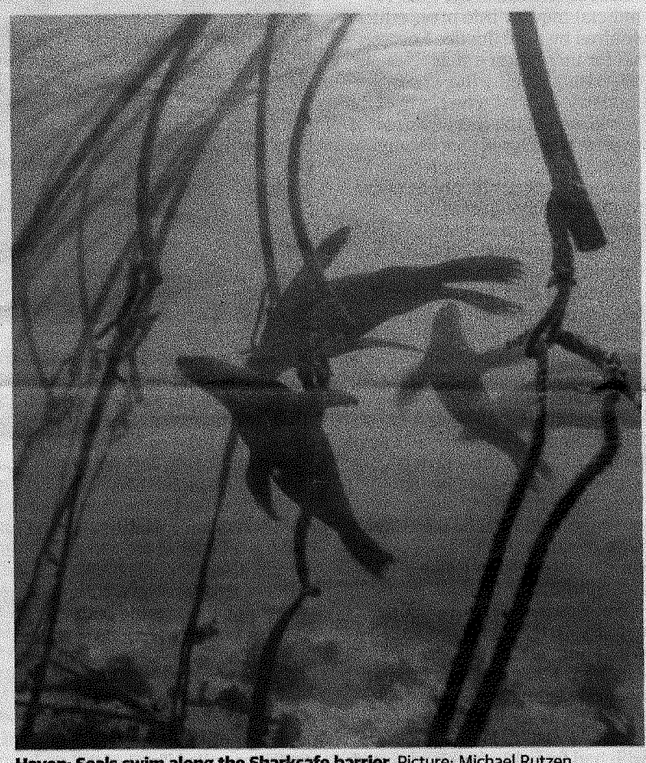
The team hopes that will change during this month's research trip.

They have built two rigs, which are suspended underwater and fitted with the deterrents and a bait canister.

Only one of the rigs will have the devices turned on, so the other rig can act as a control.

Both rigs are fitted with high definition cameras to record the sharks' behaviour.

Innovative ways to prevent shark attacks are being developed all over the world and scientists revealed their latest work at the Sharks International conference in Durban, South Africa, this month.



Haven: Seals swim along the Sharksafe barrier. Picture: Michael Rutzen

Craig O'Connell, from the University of Massachusetts, told *Agenda* he and his colleagues had developed the Sharksafe Barrier, which uses up to five rows of big vertical pipes designed to resemble a kelp forest.

"The importance of this artificial kelp forest is derived from preliminary observations that white sharks don't enter into high-density kelp forests and the Cape fur seal, a predatory favourite of the great white shark, utilises these kelp forests as an anti-predation mechanism," he said.

The pipes are filled with magnets, which have been found to interfere with sharks' electro-sensory system.

Mr O'Connell said in tests in South Africa 63 white sharks interacted with the barrier, but not one swam through to get to bait on the other side.

The WA Government has applied for environmental approval to use drum lines for the next three years. It insists it is looking for non-lethal alternatives.

The architect of WA's drum lines program, who asked not to be named for fear of reprisals from opponents, said he wanted to see if the Sharksafe Barrier and other alternatives would work off WA.

"I want the research institutions to say 'we saw this, the solution worked in this environment, we want to replicate that now off the WA coast and see what impact it has'. That's where we need to be going," he told *Agenda*.

WA researchers will next look at what humans could be doing to encourage shark attacks.

Professor Collin said they would compare the signals given off by a seal, such as its electric field, what it looked like in the water and its wake, to the signals given off by humans.

"If they are the same, and I suspect they are but nobody has actually ever measured and compared the two, we then might be able to change the human enough not to give off the same signals as a seal or something it would generally eat," he said.

It could be altering our behaviour, rather than the sharks, is one of the ways to prevent shark attacks in WA.

AGENDA