

# Chapter 7

## Other approaches

7.1 This chapter continues the examination of alternatives to currently employed mitigation and deterrent measures, such as shark spotting programs, making medical kits available at beaches to aid immediate responses to shark incidents and education. The chapter then discusses the evidence received regarding whether the various measures discussed in Chapter 6 and this chapter are ready to provide an effective response to the risk of shark encounters.

### Shark spotting programs

7.2 In Byron Bay, a shark spotters program modelled on a program used in South Africa has been trialled. The program works by:

...positioning "spotters" at strategic points along the beach and coastline. When a shark is spotted, a loud warning is issued and emergency assistance is called in the case of an incident. The spotters also work closely with local Surf Life Saving Clubs.<sup>1</sup>

7.3 In October 2017, it was reported that the Mayor of Busselton would support a shark spotting program if the proposal was also supported by the community.<sup>2</sup>

7.4 SEA LIFE Trust, which contributed funding to the Byron Bay trial, advised that in 2015–16 the Byron Bay shark spotters observed five sharks 'compared to only one recorded by authorities'. SEA LIFE Trust described the trial as 'highly effective and implemented at minimal cost'.<sup>3</sup> Sea Shepherd Australia, which has also been involved in efforts to encourage the development of shark spotting programs in Australia, noted that the South African program has operated successfully for over a decade.<sup>4</sup>

7.5 A wide range of environmental groups support the implementation of some form shark spotting program throughout Australia.<sup>5</sup> Sea Shepherd argued that a shark spotting program 'could be implemented easily and immediately into specific beaches

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1 SEA LIFE Trust, *Submission 25*, p. 6.

2 R Tetlow, 'Sharks put on the sport', *Sunday Times*, 22 October 2017, p. 22.

3 SEA LIFE Trust, *Submission 25*, p. 6.

4 Sea Shepherd Australia, *Submission 57*, p. 41.

5 See Australia for Dolphins, *Submission 4*, p. 3; Sunshine Coast Environment Council, *Submission 35*, p. 8; Greenpeace Australia Pacific, *Submission 50*, p. 16; Australian Seabird Rescue, *Submission 37*, p. 3; Australian Marine Conservation Society (AMCS), *Submission 38*, pp. 5, 6; International Fund for Animal Welfare, *Submission 40*, p. 3; Humane Society International (HSI), *Submission 43*, p. 22; Sea Shepherd Australia, *Submission 57*, p. 11;

in New South Wales, Queensland and Western Australia'. Sea Shepherd explained that two representatives of the South African program who visited Australia identified 'five beaches in South-West Western Australia, three in the Gold Coast, seven in northern New South Wales and two in Sydney which showed promise for a shark spotting program'.<sup>6</sup>

7.6 A key challenge with the program is staffing. The Shark Watch program used in Byron Bay is a volunteer program, which a key challenge for the program being 'retention and recruitment of enough volunteers to ensure the program's ongoing effectiveness'.<sup>7</sup> The South African program is a paid model,<sup>8</sup> which may be difficult to replicate in Australia due to higher labour costs.<sup>9</sup>

7.7 Mr John Heaton, who stated that he is any favour of any program 'that assists to reduce the number of encounters between humans and sharks', noted that even with the assistance of technology such as drones, shark spotting is 'very labour intensive'. Mr Heaton submitted:

It is reported that NSW Surf Life Saving membership at Ballina and Lennox Head Clubs has decreased since the increased shark activity. I am involved in a volunteer organisation and it is even hard to get 4 people to volunteer 2 hours per day, four days per week.

A Shark Watch NSW spokesperson is quoted as saying "We need 32 volunteers at one beach over two days from 9.00am to 5.00pm". Have a think about the number of beaches and headlands between Byron Bay and Yamba and try and come up with a figure to adequately cover that coastline! By all means, incorporate Shark Spotting as another mitigating measure wherever possible, but it is NOT the complete answer everywhere.<sup>10</sup>

7.8 Dr Christopher Neff noted that another limitation of shark spotting program is that, like other forms of surveillance, it requires certain weather conditions. Dr Neff argued that 'the public should be informed that cloud cover, white caps, sun glare, the type of shark, position of the shark, and size of shark can all affect visibility'.<sup>11</sup>

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6 Sea Shepherd Australia, *Submission 57*, p. 41.

7 Sunshine Coast Environment Council, *Submission 35*, p. 9.

8 Sunshine Coast Environment Council, *Submission 35*, p. 9.

9 Dr Craig Blount, Senior Environmental Scientist, Cardno (New South Wales/Australian Capital Territory) Pty Ltd, *Committee Hansard*, 17 March 2017, p. 12.

10 Mr John Heaton, *Submission 11*, p. 4.

11 Dr Christopher Neff, *Submission 48*, p. 5.

7.9 Other general observations about the limitations of surveillance are also relevant. Mr Andrew Stark, Chief Executive Officer, Surfing Australia indicated that surveillance measures can have value, but there are also clear limitations in their effectiveness. Mr Stark used the incident in 2015 when surfer Mick Fanning escaped from a shark during a surfing competition to illustrate his concerns:

All of these different surveillance measures combined are good, but I would add that when Mick Fanning got attacked by a great white shark on live TV in South Africa, there was more surveillance than you could imagine. There were 10 cameras, thousands of people on the beach, spotters, and people looking straight at him in the water and the surrounding area, and no-one saw that great white shark. It was on live television.<sup>12</sup>

## Medical kits

7.10 Another suggestion is that medical kits containing supplies for controlling bleeding and injuries should be made available at secure locations near a beach. Although only a small number of stakeholders commented this idea, those that did were supportive. The deployment of trauma kits can also be related to other programs, such as surf lifesaving and shark spotting programs. Kits developed by Sea Shepherd Australia include 'medical shears to cut through neoprene if necessary, trauma bandages, emergency blankets to keep a patient warm, tourniquets to stop the flow of blood loss, and a pictorial instructional sheet'.<sup>13</sup> The committee also received evidence that manufacturers of surfboard leg-ropes are producing leg-ropes that can also be used as a tourniquet.<sup>14</sup>

7.11 Cr Simon Richardson, Mayor, Byron Shire Council, explained that the kits ensure an immediate trauma response can be provided:

The bottom line is that if there is an attack on the beach...sometimes those first few minutes can be quite crucial as far as stemming the blood flow et cetera is concerned.<sup>15</sup>

7.12 Evidence of the medical kits enabling a successful response to a shark bite can be found from the South African shark spotting program. Ms Banks from Sea Shepherd Australia explained that the trauma kits available as part of that program have saved a life.<sup>16</sup>

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12 Mr Andrew Stark, Chief Executive Officer, Surfing Australia, *Committee Hansard*, 2 May 2017, p. 31.

13 Sea Shepherd Australia, *Submission 57*, p. 12.

14 Mr Jeff Hansen, Sea Shepherd Australia, *Committee Hansard*, 20 April 2017, p. 16.

15 Cr Simon Richardson, Mayor, Byron Shire Council, *Committee Hansard*, 2 May 2017, p. 23.

16 Ms Natalie Banks, Chief Advisor, Sea Shepherd Australia, *Committee Hansard*, 20 April 2017, p. 14.

7.13 Representatives of Sea Shepherd Australia, which was the main advocate of trauma kits during this inquiry, commented that if these kits 'were in a locked box where a number of people knew the codes there would be great advantages for saving lives'. It was noted that, at Byron Bay, the kits are kept a café near the beach to protect the kits from being stolen.<sup>17</sup> At remote beaches where the kits cannot be stored in a secure location, it was suggested that a locked box with a code known by locals could be used. On the risk of vandalism to these unprotected boxes, Mr Hansen from Sea Shepherd stated:

We have spoken to a number of surfers down south [in WA]...and they said, 'Well, if anyone messes with that, they'd have to deal with us first.' So whether it would be a locked box or whatever that a number of the locals know so that at least someone on the beach would know it, we need something if there are tourists there on the day. There are tourniquets on leg-ropes that are coming out now, that companies are pushing as well. There are a range of options.<sup>18</sup>

7.14 Cr Simon Richardson, Mayor, Byron Shire Council, explained kits are available in Byron Bay and the council is investigating making further kits available 'probably...with the surf lifesavers et cetera'. Cr Richardson noted that the kits are 'not overly expensive' and suggested that a further rollout of kits is likely to be supported by the community.<sup>19</sup>

7.15 Mr Dale Carr, who survived an encounter with a shark, stated that the shark attack first aid kit promoted by Sea Shepherd 'is a good idea'. He added:

When I spoke to Dave Pearson and his friends on the south side of Crowdy Bay—it is a good 12 kilometres away from Harrington—they had one in their car. They did not need to have it because of a shark attack. They always had one, and that was just good common sense. Any suggestions from someone over in Western Australia in regard to remote locations and medical facilities, I would wholeheartedly support.<sup>20</sup>

7.16 It was acknowledged, however, that some training is needed to use the kits effectively.<sup>21</sup>

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17 Mr Jeff Hansen, Managing Director; Ms Natalie Banks, Chief Advisor, Sea Shepherd Australia, *Committee Hansard*, 20 April 2017, p. 13.

18 Mr Jeff Hansen, Sea Shepherd Australia, *Committee Hansard*, 20 April 2017, p. 13.

19 Cr Simon Richardson, Mayor, Byron Shire Council, *Committee Hansard*, 2 May 2017, p. 23.

20 Mr Dale Carr, Member, Bite Club; Beyond the Bite, *Committee Hansard*, 2 May 2017, p. 16.

21 Mr Jeff Hansen, Sea Shepherd Australia, *Committee Hansard*, 20 April 2017, p. 13.

## Education

7.17 Regardless of their views on the effectiveness and desirability of lethal shark control programs and other non-lethal measures, the submitters and witnesses that participated in this inquiry generally supported proposals for education programs to help enhance public safety and knowledge about sharks. This section discusses the evidence received regarding education strategies.

### *Education about sharks generally*

7.18 CSIRO noted that although information about sharks can be easily found 'the veracity of some of this information is questionable'. Consequently, CSIRO submitted that there 'is an important role in continuing to provide accurate information to the public regarding sharks in the marine environment'.<sup>22</sup> This issue was picked up by other witnesses, who commented on some of the myths about sharks that can be accepted. Dr Neff stated:

I would say it is the combination of an absence of educational information and the presence of movie monster myths. It is the worst-case scenario, where the only stories people hear are the ones about rogue sharks—and this happened in Ballina; they said, 'If we just kill the seven sharks that are responsible for all the shark bites, we'll have solved the problem.' I heard that same story in Reunion Island. I heard that same story in Cape Town. I hear that same story Western Australia. There is this sort of myth that travels, and it really gets a hold of folks, and I completely understand it, but part of it is the way in which government reinforces myth-making and folklore instead of public education.<sup>23</sup>

7.19 Similarly, the Australian Marine Conservation Society (AMCS) suggested that government-supported education programs could assist to 'mitigate negative public attitudes and misplaced fear about sharks'. Noting that the risk of shark encounters is statistically low, the AMCS argued that education that assists the public to understand 'the very low risks associated with shark interactions in relation to the other risks people are exposed to in our daily lives' is important, including for addressing the concerns of the tourism sector.<sup>24</sup>

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22 CSIRO, *Submission 33*, p .5.

23 Dr Christopher Neff, *Committee Hansard*, 17 March 2017, p. 3.

24 AMCS, *Submission 38*, p. 10. Education in this area could potentially be achieved by other means; for example, it has been suggested that eco-tourism would 'alter the way sharks are perceived'. See Sea Shepherd Australia, 'Alternatives to drum lines and shark nets', [www.seashepherd.org.au/apex-harmony/overview/alternatives.html](http://www.seashepherd.org.au/apex-harmony/overview/alternatives.html) (accessed 7 December 2016).

### *Suggestions for education strategies and programs intended to promote public safety*

7.20 Several stakeholders argued that raising public awareness about swimmer safety (such as avoiding swimming where sharks are known to congregate and when it may be difficult to see an approaching shark)<sup>25</sup> is an area where education programs could add particular value. There was broad support for an education program to improve understanding among the general public and tourists visiting beaches about shark behaviour and conditions or activities associated with a higher degree of risk.<sup>26</sup> For example, Mr Chris Peck, General Manager, Lifesaving and Training, Surf Life Saving Western Australia, stated:

...we certainly think that more education and awareness could be provided...In terms of developing a culture and an understanding, there is a long process for that and you have to start somewhere. We do not think we have enough support to deliver that education and awareness, particularly to school groups where you are often commencing the development of a culture.<sup>27</sup>

7.21 Existing education efforts were noted which, it was suggested, could be enhanced and expanded. For example, Professor Shaun Collin noted that, as part of its Sharksmart website, the Western Australian Government has published an online list of the 'dos and don'ts of interacting in the ocean in relation to sharks'. Professor Collin noted this should be updated as needed. Professor Collin added that the delivery of educational strategies could be supported by the establishment of an educational officer for the state. He suggested that this officer would 'help educate the public and open a very good communication channel which is always there'.<sup>28</sup>

7.22 Examples of where shark-related deaths have occurred in situations considered to be dangerous were provided to demonstrate how further education may assist. The Sunshine Coast Environment Council (SCEC) submitted:

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 drum lines, and while local fishermen were cleaning caught fish and dumping the

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25 A list of safety measures is at Taronga Conservation Society Australia, 'Prevention of shark attacks', <https://taronga.org.au/animals-conservation/conservation-science/australian-shark-attack-file/prevention-shark-attacks> (accessed 20 December 2016).

26 Mr Brendan Donohoe, Northern Beaches Branch President, Surfrider Foundation Australia, *Committee Hansard*, 17 March 2017, p. 24; Australian Seabird Rescue, *Submission 37*, p. 4; HSI, *Submission 43*, pp. 25–26; Sunshine Coast Environment Council, *Submission 35*, p. 12. The Sunshine Coast Environment Council added that this education should also emphasise the role sharks perform in the marine environment.

27 Mr Chris Peck, General Manager, Lifesaving and Training, Surf Life Saving Western Australia, *Committee Hansard*, 20 April 2017, p. 4.

28 Professor Shaun Collin, *Committee Hansard*, 20 April 2017, pp. 42–43.

entrails into the water. 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.<sup>29</sup>

7.23 Other stakeholders noted the importance of education about potentially dangerous conditions. Mr Brendan Donohoe, Northern Beaches Branch President, Surfrider Foundation Australia, noted that:

Surfrider has had a policy for many years that, if there are reported shark sightings, surfing at dawn and twilight is not the best. Surfing near effluent outlets is no good. River mouths, where congregations of baitfish occur and where there is loads of fishing taking place are all things to be avoided. I think surfer education, beachgoer education and more money for research and medical facilities at beaches are the way to go.<sup>30</sup>

7.24 Mr Don Munro agreed that it is important to teach children to look for signs that sharks may be present. Mr Munro stated:

You teach kids to swim and then you teach kids to understand what is happening in the ocean, particularly when it comes to marine life. We know simple little signs like bird thrashing, bait balls—they are very easy to distinguish. There is not much more you can do other than what I have just explained, but we drill that into the kids, and even our five-year-olds will tell you, 'Look, Donny, there's baitfish there; I shouldn't go out.' That is right. You do not.<sup>31</sup>

7.25 Mr Munro added that he has suggested that a program to pass on this knowledge to children should be introduced in schools. He added:

I know I would volunteer my time to do that, and there would be others who would do so as well. It just has not got off the ground as such.<sup>32</sup>

7.26 Dr Leah Gibbs and Dr Jan-Olaf Meynecke also expressed support for the expansion of education strategies, particularly through schools and nippers programs. Dr Meynecke advised that he has given talks on marine biology and marine science to schools, although he added that these talks occurred following invitations from individual schools, rather than as part of a comprehensive program.<sup>33</sup>

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29 Sunshine Coast Environment Council, *Submission 35*, pp. 3–4 (emphasis omitted).

30 Mr Brendan Donohoe, Northern Beaches Branch President, Surfrider Foundation Australia, *Committee Hansard*, 17 March 2017, p. 24.

31 Mr Donald Munro, President, Le-Ba Boardriders; and Spokesperson, Lennox Head National Surfing Reserve, *Committee Hansard*, 2 May 2017, p. 5.

32 Mr Donald Munro, *Committee Hansard*, 2 May 2017, p. 5.

33 Dr Leah Gibbs, *Committee Hansard*, 31 July 2017, p. 6; Dr Jan-Olaf Meynecke, *Committee Hansard*, 31 July 2017, p. 14.

7.27 Education programs on how to respond to shark bites was also suggested. Surfing Australia explained that it operates a program in New South Wales, which it would like to expand to nationally, that seeks to educate and train surfers to provide first aid. Mr Stark added that the program aims to get surfers out of the water and providing first aid, and that how to respond to a shark bite could be added to the program.<sup>34</sup>

7.28 Increased signage at beaches so that beachgoers are exposed to reliable information about the shark-related risks was also supported. Dr Sharon Burden argued that appropriate signage is a straightforward and essential public safety strategy. Dr Burden stated:

As a simple example, if you go into any workplace, you will see warning signs where there are risks: 'watch your head', 'watch your step', danger signs about electrical risks, and you will see signs on beaches. And yet I have been down on Bunker Bay for the two days preceding today and there is still no sign at any point there that would let any visitor know that there has ever been an attack, that there is a risk and that there are high-risk times of the year.<sup>35</sup>

7.29 Dr Burden recounted a conversation with a local surfer at Bunker Bay who told her that '[a]s a local I know that this spot is not a beach you would surf at around August and September...because the whales come in too close to the headland'. Dr Burden remarked:

Why isn't there a nice sign down the bottom done in nice colours that talks about shark migration patterns and says that the whales will be around at this time of year, when the salmon come into the bay, these are things to look out for and, more importantly, if something does happen what you do? What first aid could you apply to try to save that person's life if it did occur? What are you going to do to make access? There could be a QR code that takes them straight to all the apps. You could check your sign. There are so many things that could be on that sign that would give me as an individual some options.<sup>36</sup>

7.30 Dr Burden further contrasted the lack of signs about sharks with the approach taken to other risks elsewhere, such as the signs used in northern Australia warning about crocodiles and stingers.<sup>37</sup>

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34 Mr Andrew Stark, Chief Executive Officer, Surfing Australia, *Committee Hansard*, 2 May 2017, p. 31.

35 Dr Sharon Burden, *Committee Hansard*, 28 July 2017, pp. 18–19.

36 Dr Sharon Burden, *Committee Hansard*, 28 July 2017, pp. 21–22.

37 Dr Sharon Burden, *Committee Hansard*, 28 July 2017, p. 22.

7.31 The SCEC also referred to the signs and education campaigns used to warn about crocodiles. The SCEC, which referred to the 'Be Croc Wise' campaign, argued that signage and a campaign based on the crocodile awareness efforts would be 'relatively low-cost' and 'provide significant benefit'. The SCEC cautioned that the program 'should be changed to reflect that, similarly to crocodile prone areas, it isn't always appropriate to swim in "shark habitats" under certain conditions'.<sup>38</sup>

7.32 Mr Ian Wiese, who supports additional signage, cautioned that any signs used need to provide information designed to help beachgoers understand the different risks presented by sharks at particular locations at different times of the year. Mr Wiese explained by referring to a sign put up a local council that indicates past shark activity, with space for displaying the date of the activities. Mr Wiese commented that the sign does not provide interpretative information that beachgoers need to assess the risk of sharks. Mr Wiese continued:

I just noticed that the sign is still there, this morning, and there haven't been any sharks sighted there for several months. So it loses credibility. What I was recommending was that there be more substantial signage installed that explained that at this time of year there are salmon migrating, and sharks follow them on a routine basis; they're being attracted in to the shore by fishermen, and it's probably not wise to go swimming if you don't want to be swimming with sharks.<sup>39</sup>

7.33 However, other witnesses noted that the evidence suggests education about risky conditions can go only so far in assisting public safety. Mr Heaton observed that:

Apart from the attack on Graig Ison at Evans Head at approx 6.10am on 1/8/15, all the attacks from September 2014 to October 2016 have occurred in the middle of the morning or afternoon on a bright sunny day with clear visibility in the ocean.<sup>40</sup>

### **Are new technologies and other approaches ready to replace lethal measures?**

7.34 Having examined the evidence received about emerging technologies and the evidence received about lethal measures, the key issues for consideration are whether new and emerging technologies, either individually or when used as a suite of measures, are sufficiently advanced, proven to be effective and can be utilised at a reasonable cost.

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38 Sunshine Coast Environment Council, *Submission 35*, p. 11.

39 Mr Ian Wiese, *Committee Hansard*, 28 July 2017, p. 42.

40 Mr John Heaton, *Submission 11*, p. 2. Mr Andrew Stark, Chief Executive Officer, Surfing Australia, made a similar point: he noted that according to Surfing WA, the average time of shark attacks in WA in the last few years was 11 am. See *Committee Hansard*, 2 May 2017, pp. 34–35.

7.35 There is already movement in this direction, such as the Western Australian Government's shark management strategy that includes a trial rebate of \$200 for independently verified devices purchased by surfers and divers. The strategy also provides funding for drones, receivers for tagged sharks and for an additional beach enclosure.<sup>41</sup>

7.36 Dr Bucher and Professor Harrison expressed support for 'observational and warning strategies rather than shark removal options'; however, they acknowledge that SMART drum lines are 'a more effective and far less destructive method to remove dangerous sharks from beaches than nets'. Accordingly, Dr Bucher and Professor Harrison argued that new nets and traditional drum lines should not be permitted and existing equipment phased out.<sup>42</sup>

7.37 Environmental groups urged the removal of shark nets and drum lines. An example of this position was expressed by the AMCS. In addition to the overall removal of shark nets and drum lines, the AMCS argued that the following actions should be prioritised:

- removing nets and drum lines 'during known wildlife migration times and from known migration pathways';
- removing nets and drum lines from 'high conservation value areas such as the Great Barrier Reef Marine Park and from areas where high catches have been recorded of dugong, turtles, dolphins, grey nurse sharks and other threatened, endangers or protected species'; and
- removing nets and drum lines in areas that 'have stinger nets in place and that have never had a shark incident'.<sup>43</sup>

7.38 The evidence given by Mr John Heaton, who supports lethal shark control measures to support public safety, provides an example of the contrary approach. Mr Heaton argued that the number of shark attacks warrant the use of all available measures, including lethal measures. He stated:

As a surfer of over 50 years, I have never experienced the number of shark attacks like we have had for the two years September 2014 to October 2016. The "experts" cannot give a reason for the spike in attacks and provide a figure for the number of Great Whites we currently have migrating the east coast of Australia.

Therefore, until such time as the "experts" can provide some answers, I am prepared for the NSW Government to use all shark mitigating &

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41 The Hon Dave Kelly MLA, Western Australian Minister for Fisheries, 'A smarter approach to shark mitigation in WA waters', *Media release*, 13 May 2017.

42 Dr Daniel Bucher and Professor Peter Harrison, *Submission 23*, pp. 5–6.

43 AMCS, *Submission 38*, p. 11.

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deterrent measures available to prevent/reduce the number of interactions between humans and sharks.<sup>44</sup>

7.39 Mr Don Munro argued that nets and drum lines should be replaced following further research and development of alternative technologies and 'when proven long-term technologies have been successfully identified'. At present, Mr Munro argued that the alternative shark mitigation and deterrent technologies that are available 'should be in conjunction with but not in place' of the existing lethal measures.<sup>45</sup>

7.40 There are some clear limitations associated with new technologies. For example, as noted in Chapter 6, at present personal electrical deterrents are not suitable for children due to the electric shocks involved. Other products appear to require further testing; Australian Aerial Patrol argued that the criteria used to evaluate the performance of sonar devices and beach enclosures 'are unknown'. Regardless, it argued that '[w]aiting for shark bites to occur in areas that have trials versus no trials could take decades and have a questionable ethical basis'.<sup>46</sup>

7.41 Uncertainties about emerging technologies are sufficient for key organisations to be wary of endorsing them. In relation to personal deterrents, Mr Andrew Stark, Chief Executive Officer, Surfing Australia, commented that his organisation would not want to endorse a product without being certain that the product would provide complete protection. This position was summed up as follows: 'If we were to recommend a product like that and say that we advise that surfers should choose it...and then someone was killed by a shark with one of those on, what position would that put Surfing Australia in?'.<sup>47</sup>

7.42 The Australian Institute of Marine Science (AIMS) added that providing large-scale protection against sharks is inherently challenging. It observed:

The scale of Australia's marine estate, the extent of the migrations of many species known to interact with humans, the fact that most shark attacks occur on surfers, spear-fishers and divers, commonly away from patrolled swimming beaches (and often in remote locations) make 'large scale' mitigation a daunting challenge.<sup>48</sup>

7.43 Although AIMS considers that personal deterrent devices offer 'hope of risk reduction', it is of the view that, at present, 'there is nothing on the horizon that is considered an effective universal deterrent'.<sup>49</sup>

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44 Mr John Heaton, *Submission 11*, p. 6 (emphasis omitted).

45 Mr Donald Munro, *Committee Hansard*, 2 May 2017, p. 1. See also *Submission 39*, p. 1.

46 Australian Aerial Patrol, *Submission 6*, p. 25.

47 Mr Andrew Stark, Surfing Australia, *Committee Hansard*, 2 May 2017, p. 32.

48 Australian Institute of Marine Science, *Submission 49*, p. 5.

49 Australian Institute of Marine Science, *Submission 49*, p. 5.

7.44 Finally, concerns were expressed that, despite the government and public interest in shark-related matters, the development of new technologies does not receive adequate support. In correspondence to the committee, Mr Talmage was sharply critical of the lack of support received to date from government regarding the development of the technology. Mr Talmage commented that although the 'expansion curve is steep', the Clever Buoy system is:

...progressing towards being the world's first fully sustainable ocean wildlife monitoring system and is a great example of innovative technology developed in Australia by Australians with no direct government support.<sup>50</sup>

7.45 Despite this progress, Mr Talmage wrote that the ongoing innovation of Clever Buoy in Australia is, in his view, being constrained by 'inertia' within government. Mr Talmage described his experience engaging with local, state and Commonwealth governments as 'extremely slow and frustrating'. Mr Talmage elaborated on his concerns as follows:

There appears to be no clear guidelines for engagement or ownership from federal and state government to support and fund local government initiatives for shark mitigation measures. We have engaged with many local councils and local mayors around Australia, and consistently they want to proceed but are constrained by lack of direction and funding support. The early adopters market in Australia would seem to be too small to support the required growth of a unique and viable technology like Clever Buoy. Momentum for Clever Buoy in Australia has waned as a result of the bureaucratic process, and [Shark Mitigation Systems] is now shifting focus on the global market, specifically the US market, with substantial interest in the technology and the incidence of shark interactions increasing around the globe.<sup>51</sup>

7.46 A further aspect of the role of government in relation to emerging technologies is the support they can provide for the development and commercialisation of emerging technologies. Like the developer of Clever Buoy, the managing director of Shark Shield expressed concern that governments are not sufficiently interested in the development of new technologies. As noted in Chapter 6, during his evidence to the committee in April 2017, Mr Lyon announced a new product that, unlike personal deterrents, is designed to provide long-range protection. During a subsequent appearance before the committee, Mr Lyon advised an order had been placed by a police force; however, 'no queries from local councils or state or federal governments' had been received. Mr Lyon stated:

We are relatively amazed, given the lives lost and the community economic damage from shark attacks, as to why there has been no interest to date in commissioning a pilot or a test program for Ocean Guardian, given that it is

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50 Mr Richard Talmage, Correspondence dated 4 August 2017 (published as *Additional Information 11*), p. 1.

51 Mr Richard Talmage, *Additional Information 11*, p. 2. See also Mr Tony Isaacson, DiveCareDare, *Committee Hansard*, 31 July 2017, p. 46.

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based on science and proven shark-deterrent technology that has been in the market for 20 years. We have over 60 years of knowledge of shark sensory systems and 20 years of building deterrent products. We are wondering what more evidence is required.<sup>52</sup>

7.47 Mr Lyon continued:

At this time we are building the Ocean Guardian product to target the luxury yacht and commercial market, but at this point in time we are not progressing with solutions for beach barrier community protection to replace shark nets as, clearly, there appears to be no commercial interest in a solution to protect beaches and the environment. The federal government talks about innovation, and yet the world's leading technology company in shark mitigation—the Tesla of our space—has received no interest in a commercial implementation from any Australian government body.<sup>53</sup>

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52 Mr Lindsay Lyon, Managing Director, Shark Shield, *Committee Hansard*, 28 July 2017, p. 56.

53 Mr Lindsay Lyon, Shark Shield, *Committee Hansard*, 28 July 2017, p. 57.

