

Murky Waters: Understanding and Responding to Unprovoked Shark Bite.

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Overview

- The mythology of sharks.
- Our fear of sharks.
- Sharks and the media
- Understanding the sensory biology and behaviour of sharks.
- Trends in unprovoked shark bite.
- Mitigating the risks:
 - Why no shark nets for northern NSW?
 - Personal approaches
 - Whole of beach approaches.

The Mythology of Sharks

The Mythology of Sharks

- Sharks feature in the mythology of virtually all Pacific First Nation peoples and also in Greek mythology:
 - In Fijian mythology, **Dakuwaqa** is a shark-god that protected fishermen from danger.
 - In Greek mythology **Akehelios** was a shark-shaped sea-demon.
 - In Japanese mythology, **Isonade** was a shark demon.

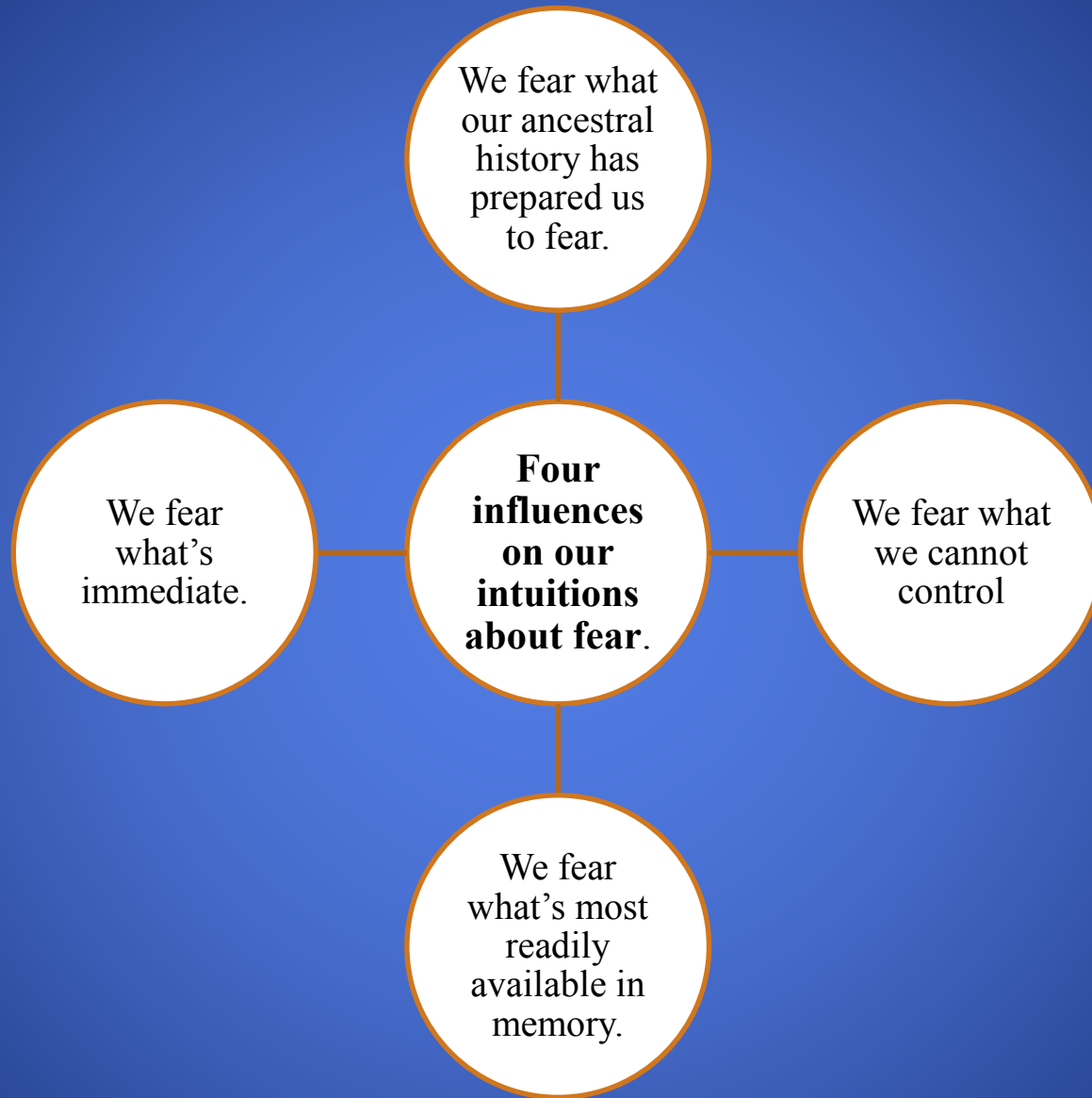
The Mythology of Sharks in Contemporary Society

- The movies *Jaws* has elevated the mythology of the shark above other animals that cause harm to humans.
- The tyranny of free speech on the internet has allowed for the proliferation of a form of modern mythology.

Our Fear of Sharks

Understanding Our Fear of Sharks

- Humans are hardwired to respond to information with feelings first and thoughts second.
- Fear is one of our most primitive human emotions.
- Clearly the probability of an unprovoked shark bite is extremely low.
 - On Australian surf beaches between 2001 and 2005, 129 people drowned whereas during the same period fatalities from shark bite numbered five (5).
- While examined from the perspective of the probability of harm occurring, fear of sharks can be considered irrational.



The Bottom Line

- When the psychology of fear is examined more closely, fear of sharks is not irrational.
- Governments need to acknowledge public fear and concerns as real and meaningful, and then demonstrate a willingness to act and take responsibility.

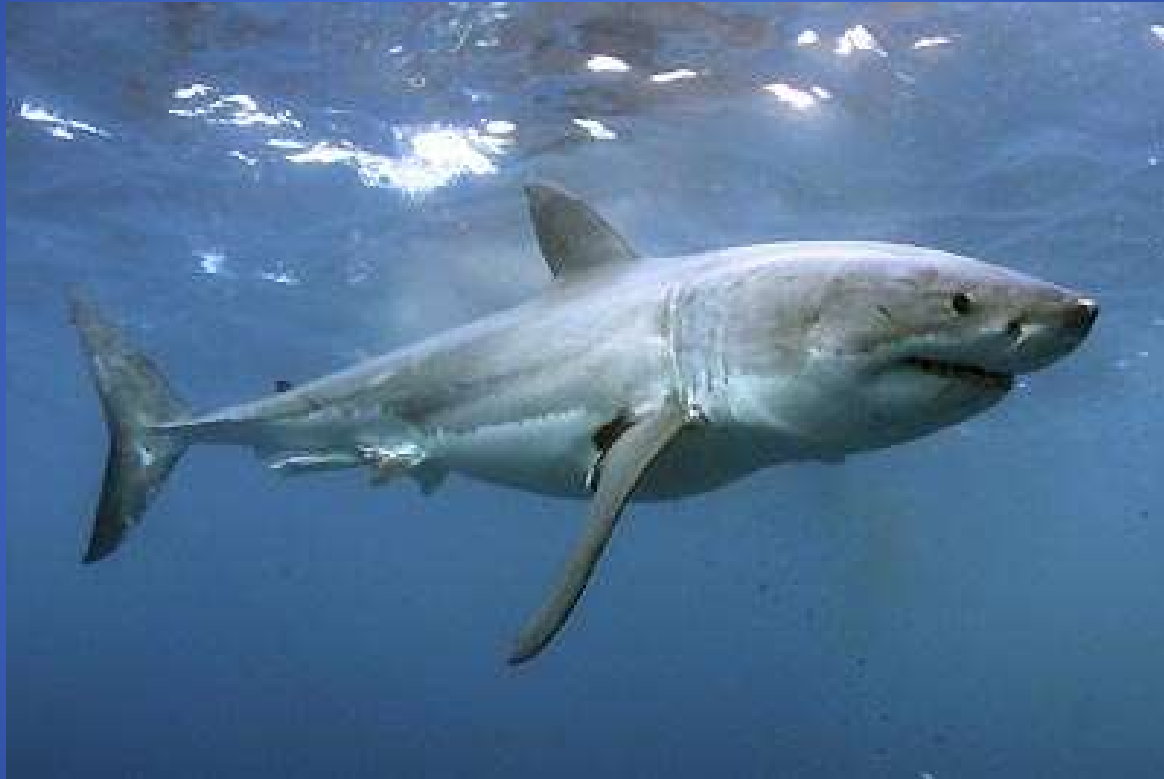
The Media and Unprovoked Shark Bite

Fear of Sharks and the Media

- The media focuses on issues that are low frequency but high consequence such as wildlife-related human injuries and particularly fatalities.
 - This will not change so we need to live with it.
- Media reports almost certainly leads to the **perception of risk** being higher than the **actual risk**.
 - However, it is not helpful to simply to blame the media.
- The global and instantaneous nature of modern media (including social media) is further increasing the media reach.

Sharks - Sensory Systems and Habitats

Species of Sharks Mostly Responsible for Unprovoked Shark Bite



White Shark - *Carcharodon carcharias*



Geographic Distribution of the White Shark



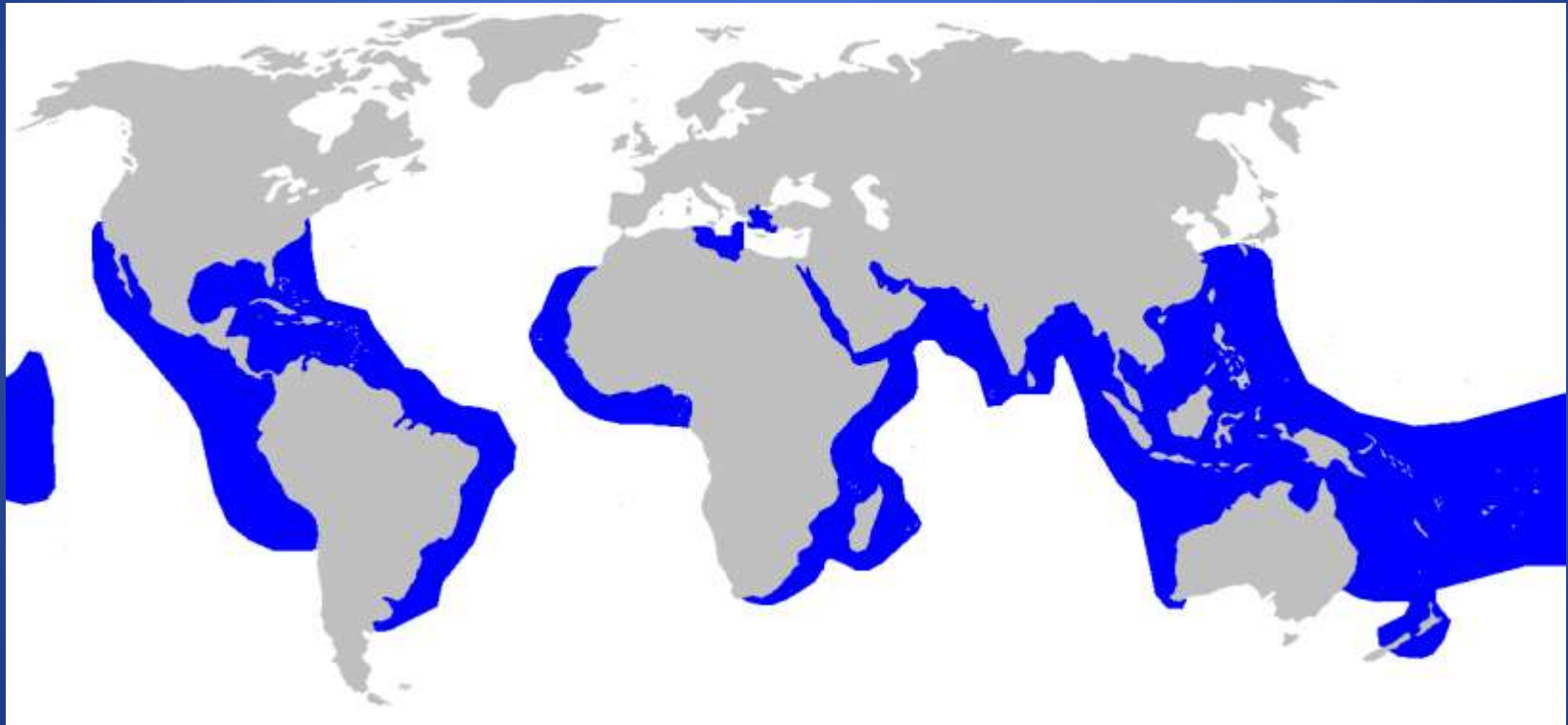
Despite this map they are not restricted to coastal waters and move through the open ocean, including diving down to great depths.

Species of Sharks Mostly Responsible for Unprovoked Shark Bite

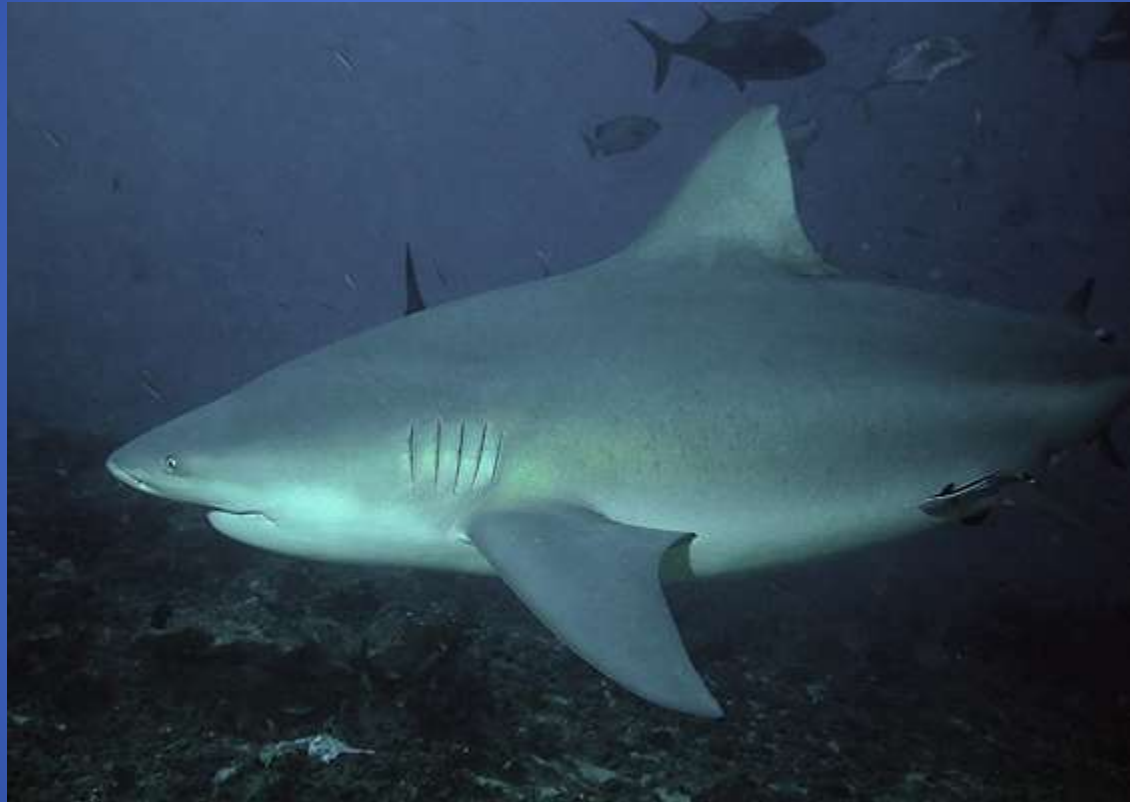


Tiger Shark - *Galeocerdo cuvier*

Geographic Distribution of the Tiger Shark

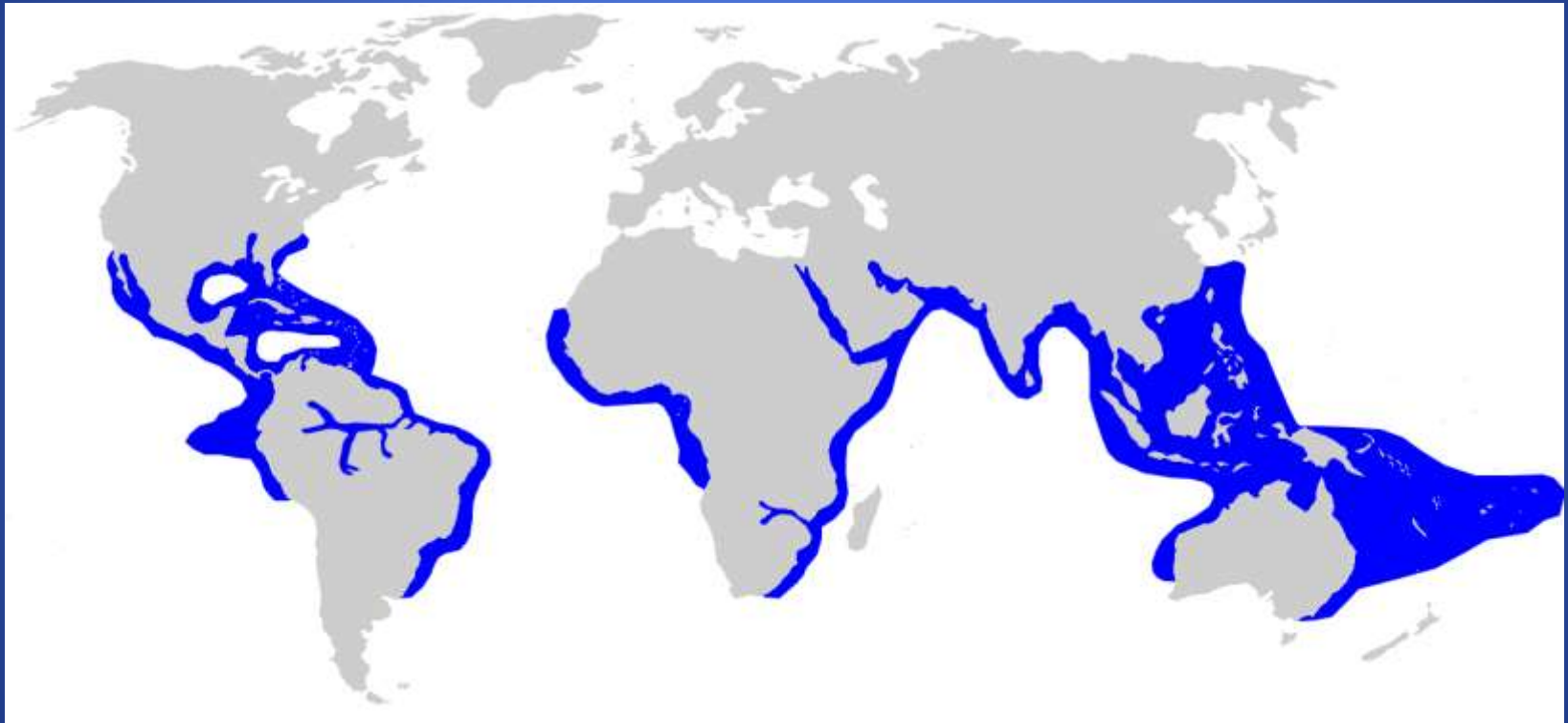


Species of Sharks Mostly Responsible for Unprovoked Shark Bite



Bull Shark - *Carcharhinus leucas*

Geographic Distribution of the Bull Shark



Shark Sensory Systems

Electroreception
(to ~ 50 cm)

Pressure Detection
(Variable ~ 100 m)

Hearing
(up to several km)

Touch



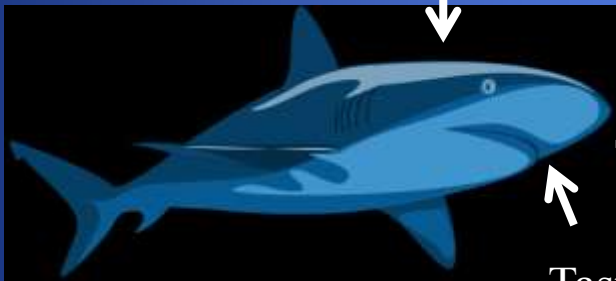
Taste

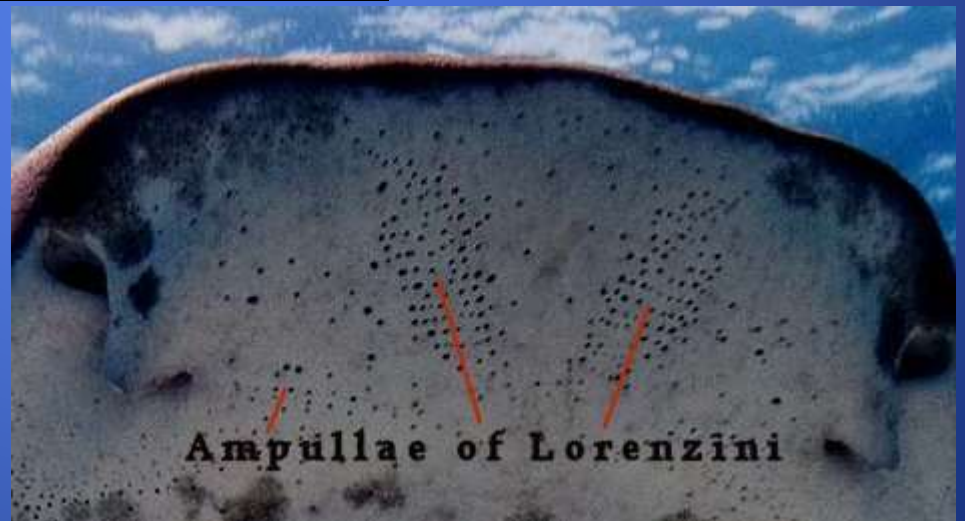
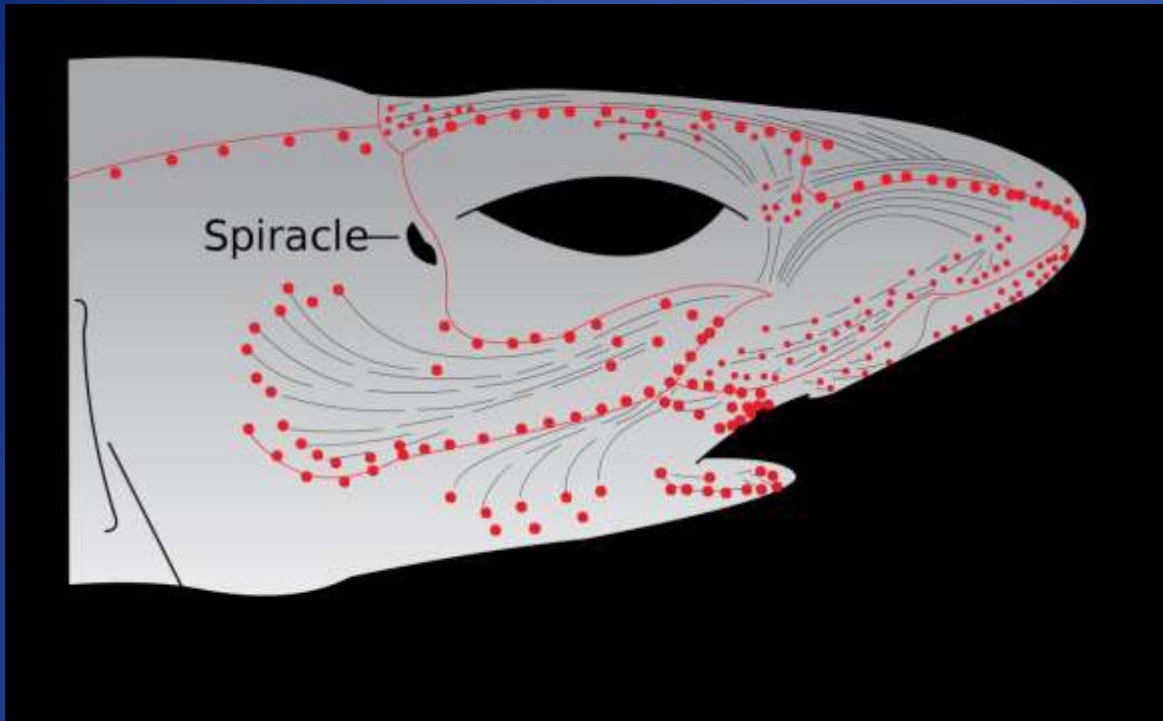


Vision
(variable up to ~ 50 m)

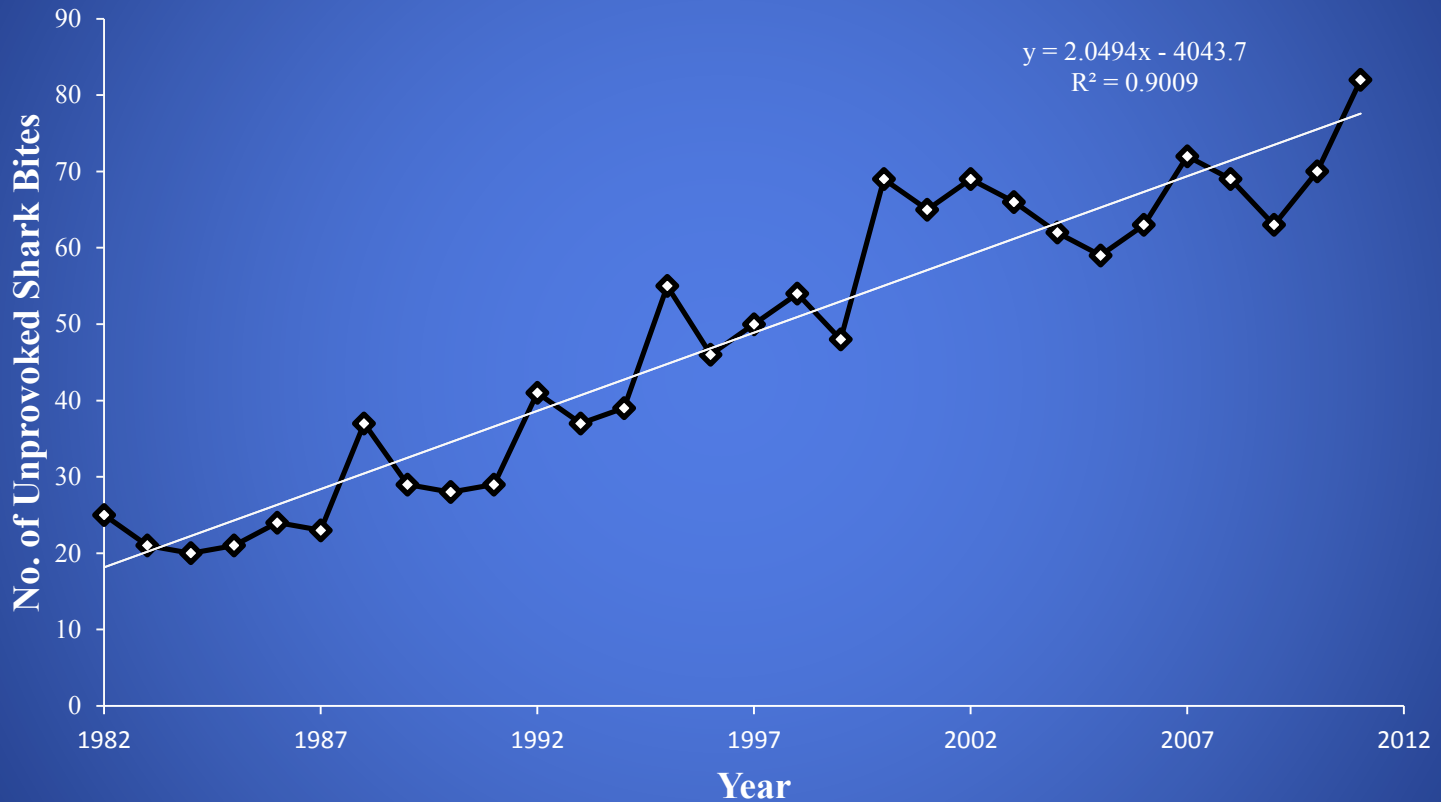
Smell
(> 100m)

An eighth sense: Magnetoreception?





Global Trends in Unprovoked Shark Bites (1982-2012)



Source: McPhee (2014) Unprovoked Shark Bites: Are They Becoming More Prevalent? *Coastal Management* 42(5): 478-492.

Geographic Location

- Over the last 30 years:
 - Unprovoked shark bites is recorded from 56 countries.
 - 27 countries have recorded fatalities.
 - Six countries responsible for 84% of the total records.
 - The proportion of bites that result in fatalities is geographically variable.

Geographic Location

Country	Total number	Number of fatalities	% of bites that result in fatalities
United States	769	25	3.6
Australia	171	32	18.7
South Africa	132	27	20.5
Brazil	68	22	32.3
Bahamas	42	2	4.8
Reunion	31	16	51.6

Regional Trends

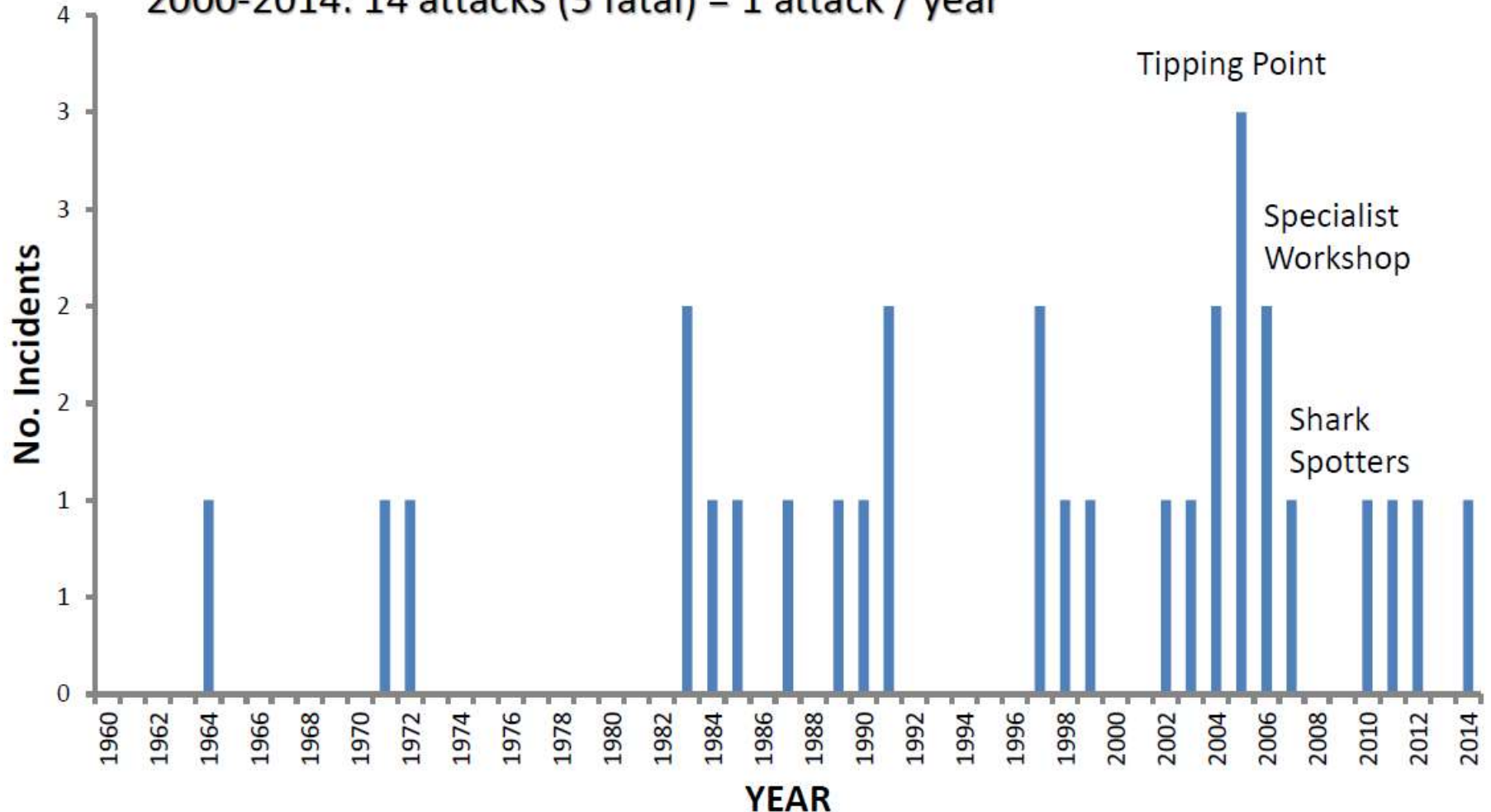
- Global trends can mask important trends at the country or regional level, and it is this scale that is important for decision makers.
- Within the overall global dataset, there are clusters where a number of unprovoked bites occur at a location or region in a relatively short space of time.
- In terms of the number of bites, there is a “tipping point” where a government is placed under substantial pressure to act (or act further) to mitigate the hazard.

Cape Town Shark Incidents

1900-1960: 9 attacks (4 fatal) = 1 attack / 6 years

1960-2014: 30 attacks (6 fatal) = 1 attack / 2 years

2000-2014: 14 attacks (5 fatal) = 1 attack / year



What are the Factors Driving the Trend?

- **More people in the water.**
- Better global reporting of incidents
- More sharks of relevant species?
- Factors that (temporarily) change the amount of overlap between relevant shark species and water users:
 - Habitat modification.
 - Concentrations of prey (marine mammals and schooling fish).
 - Water temperatures.

