



## Research Guide

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### Government Agency NOAA endorses shark repellent in a report to Congress.

- A government biologist working at NOAA has stated that our scientist partners deserve credit for developing a chemical shark repellent that works.
  - Read more details (pages 43-50): [https://pifsc-www.irc.noaa.gov/tech/NOAA\\_Tech\\_Memo\\_PIFSC\\_16.pdf](https://pifsc-www.irc.noaa.gov/tech/NOAA_Tech_Memo_PIFSC_16.pdf)
  - Reported by: <http://www.washingtonpost.com/wp-dyn/content/article/2005/08/07/AR2005080700593.html> □  
Reported by: <http://keysnews.com/node/59544>
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### Our scientists used the semiochemicals in our product to reduce shark by-catch by 71% in a government grant initiative.

- Scientists estimated that if our semiochemicals are applied globally **then 4,258,080 – 8,279,600 sharks a year will be saved.**
  - An Agency under the U.S. Department of Commerce released these findings in a report to Congress: [http://www.nmfs.noaa.gov/by\\_catch/docs/brep\\_2014\\_rice.pdf](http://www.nmfs.noaa.gov/by_catch/docs/brep_2014_rice.pdf)
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### Verified field testing on numerous shark species.

- 15 species have proven to be effectively repelled by the semiochemicals in SharkTec's product. □  
Reported by: <http://pubs.acs.org/cen/news/8251/8251critter.html> □    Reported by National Geographic: [http://news.nationalgeographic.com/news/2004/07/0729\\_040729\\_sharkrepellent.html](http://news.nationalgeographic.com/news/2004/07/0729_040729_sharkrepellent.html) □    University of Miami oversaw study.
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### A 5 year study concluded consistent, effective shark repellent results.

- A 5 year field trial on SharkTec's technology proved to repel 2 species of sharks 100% of the time within 1 minute of local dispersion of our product.
  - The findings were published in the scientific journal Ocean & Coastal Management.
  - Seton Hall University contributed to the study.
  - Published Findings:  
[http://bmis.wcpfc.int/docs/references/Stroud\\_etal\\_2013\\_Chemical\\_shark\\_repellent\\_Myth\\_fact\\_necromones\\_effect\\_OpenA.pdf](http://bmis.wcpfc.int/docs/references/Stroud_etal_2013_Chemical_shark_repellent_Myth_fact_necromones_effect_OpenA.pdf)
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**Chemical repellents may be more effective than magnetic or electrical repellents.**

- A study concluded chemical signals travel much further than mechanical or electrical signals.
  - Olfaction is considered especially important as a distant sense because chemical signals can become entrained in currents and transported much farther in the marine environment than mechanical or electrical signals (Hueter et al., 2004).
  - Reported By: <http://www.science.fau.edu/sharklab/pdfs/mk10b.pdf>
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**Shark species are chemically aware of its dead and will avoid odors that replicate this awareness.**

- Published in the Canadian Journal of Fisheries and Aquatic Sciences:  
<http://www.nrcresearchpress.com/doi/full/10.1139/f2011-072#.VrV5KLrKUK> □ Michigan State University conducted study and provided Grant. □ Great Lakes Fishery Commission endorsed study.
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## Supporting Research

**Commercial fishermen have long reported that shark fishing dramatically decreased in areas where decomposing shark tissue was present.**

- Published in Military Medicine, a peer-reviewed international journal.
  - Read More: [https://www.researchgate.net/publication/21037050\\_Shark\\_repellent\\_Not\\_yet\\_maybe\\_never](https://www.researchgate.net/publication/21037050_Shark_repellent_Not_yet_maybe_never)
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**Semiochemicals found in the bodily secretions of predators may convey survival information to a shark and elicit rapid flight from an area that is potentially dangerous.**

- Study conducted by the Department of Biological Sciences, California State University.
  - Published in Environmental Biology of Fishes international scientific journal.
  - Read More:  
[https://www.researchgate.net/publication/263688098\\_Surfactants\\_as\\_Chemical\\_Shark\\_Repellents\\_Past\\_Present\\_and\\_Future](https://www.researchgate.net/publication/263688098_Surfactants_as_Chemical_Shark_Repellents_Past_Present_and_Future)
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**Semiochemicals exist in extremely low concentrations within decaying shark flesh and act as alarm substances for other sharks in the proximity.**

- Source: Rasmussen, L.E.L., Schmidt, M.J., 1992. Are sharks chemically aware of crocodiles? In: Doty, R.L., Müller-Schwarze, D. (Eds.), Chemical Signals in Vertebrates IV. Plenum Press, New York, pp. 335e342.
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**The findings from this study suggested that sharks may be chemically aware of the presence of potential danger through the sensing of bodily secretions from predators.**

- Source: Sisneros, J.A., Nelson, D.R., 2001. Surfactants as chemical shark repellents: past, present, and future. Environmental Biology of Fishes 60, 117e129
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## Grants and Funding

- Federal Funding Grant to develop technology. ○ Source (pg.15-16): [http://www.fisheries.noaa.gov/mb/sk/pdf/sk2010\\_report.pdf](http://www.fisheries.noaa.gov/mb/sk/pdf/sk2010_report.pdf)
- 2012. NOAA Bycatch Reduction and Engineering Program (BREP).
  - Grant Details can be found at: [http://www.nmfs.noaa.gov/sfa/fisheries\\_eco/bycatch/docs/2012-brepawards.pdf](http://www.nmfs.noaa.gov/sfa/fisheries_eco/bycatch/docs/2012-brepawards.pdf)
- 2010. Great Lakes Fishery Commission. Development of a Putrefaction-Derived Repellent for the Sea Lamprey.
- 2010. National Science Foundation. Small Business Innovative Research Phase 1B Award (SBIR). “Multifunctional Hook Material for Commercial Fisheries”.
- 2010. Michigan State University, Center for Water Sciences Venture Grant. “Preliminary identification of a putrefaction-derived repellent for the invasive sea lamprey (*Petromyzon marinus*)”.
  - [http://cws.msu.edu/projects/projects\\_funded.html](http://cws.msu.edu/projects/projects_funded.html)
- 2009. Saltonstall-Kennedy Grant Program, FY 2009. “Process for Converting Shark Discards into a Shark Bycatch Reduction Technology”.
- 2005. NOAA PIFSC/JIMAR, Hawaii. Chemical repellents as a means to reduce shark bycatch in commercial longlines.
- 2005. NOAA PIFSC/JIMAR, Hawaii. Equipment/capital grant for chemical repellent research.