



The hot new accessory: Bottlenose dolphin splenic response to estuarine stressors

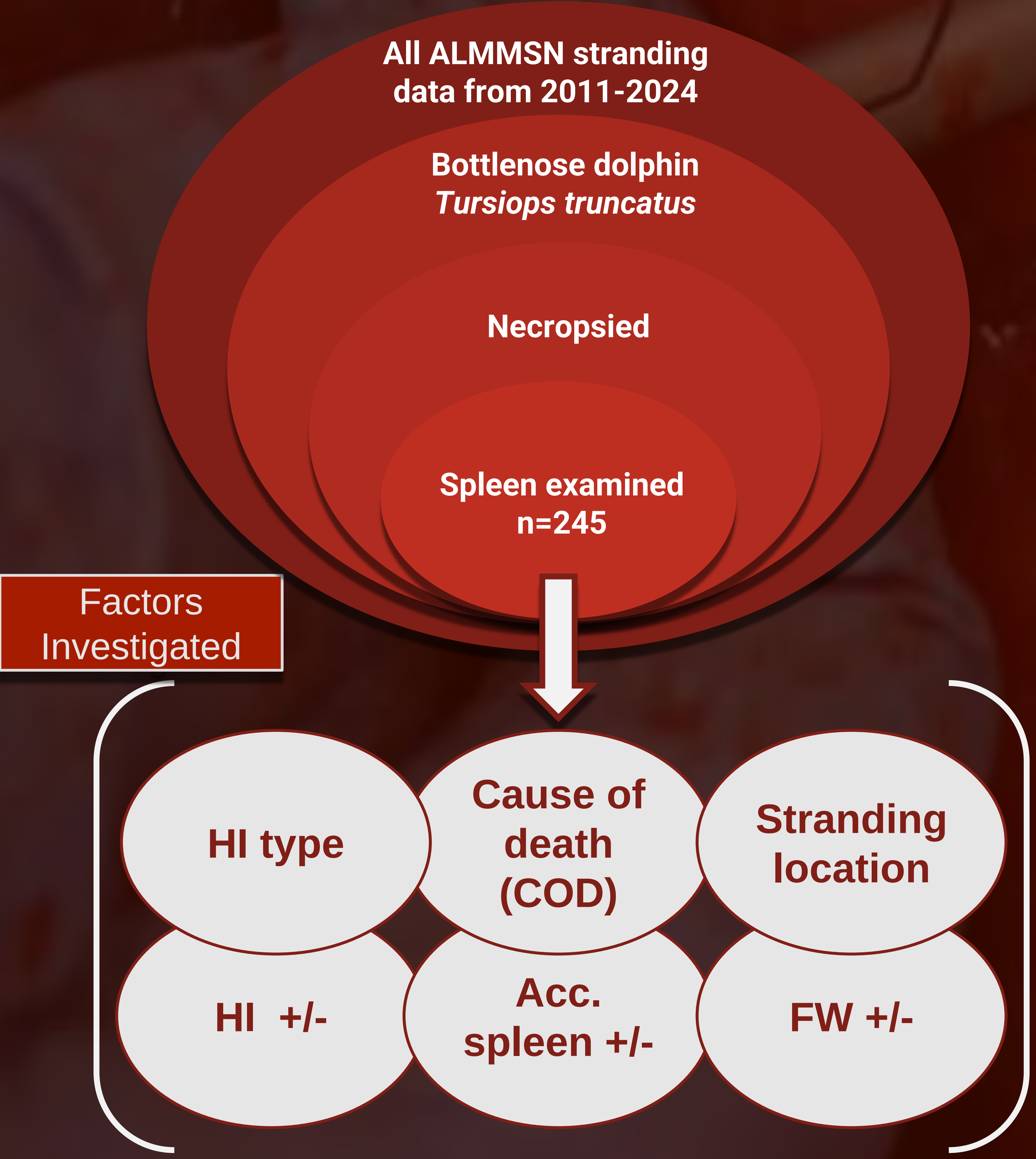
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Background

- Estuaries are dynamic habitats that potentially expose wildlife to multiple stressors, including freshwater (FW) influx, pathogens that cause disease, and human interaction (HI) (e.g., harassment, boat strikes, entanglement).
- Bottlenose dolphins (*Tursiops truncatus*) commonly occur in estuaries. It is vital to understand how estuarine stressors affect dolphins because they are the closest human analog in these systems and their health reflects ecosystem health.
- By studying the spleen, which aids in immune support and physiological response to trauma, we may better understand the effects of estuarine stressors on wildlife like dolphins.
- **This study aims to determine if the presence of accessory spleens in bottlenose dolphins may be related to estuarine stressors.**

Methods

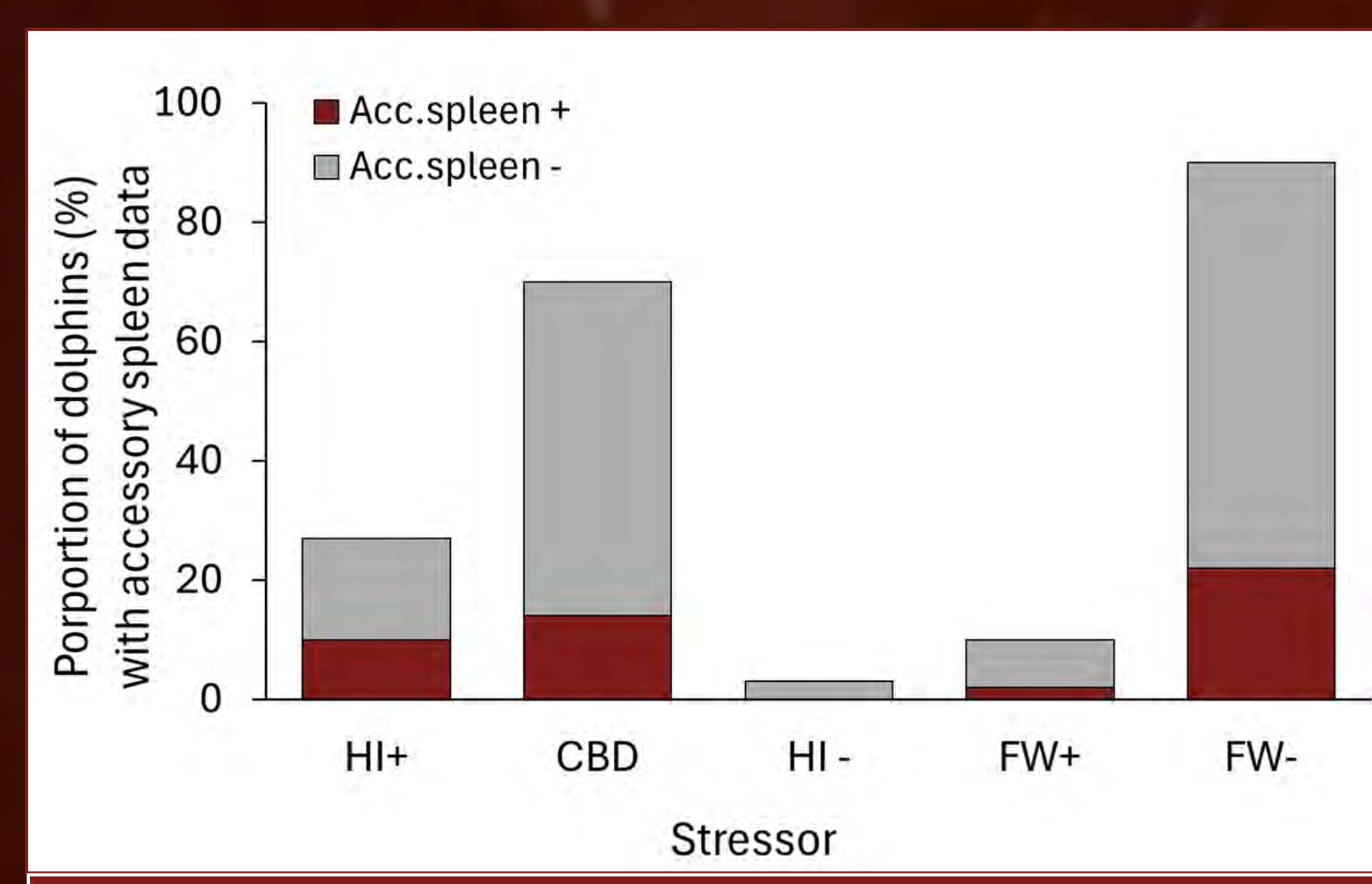
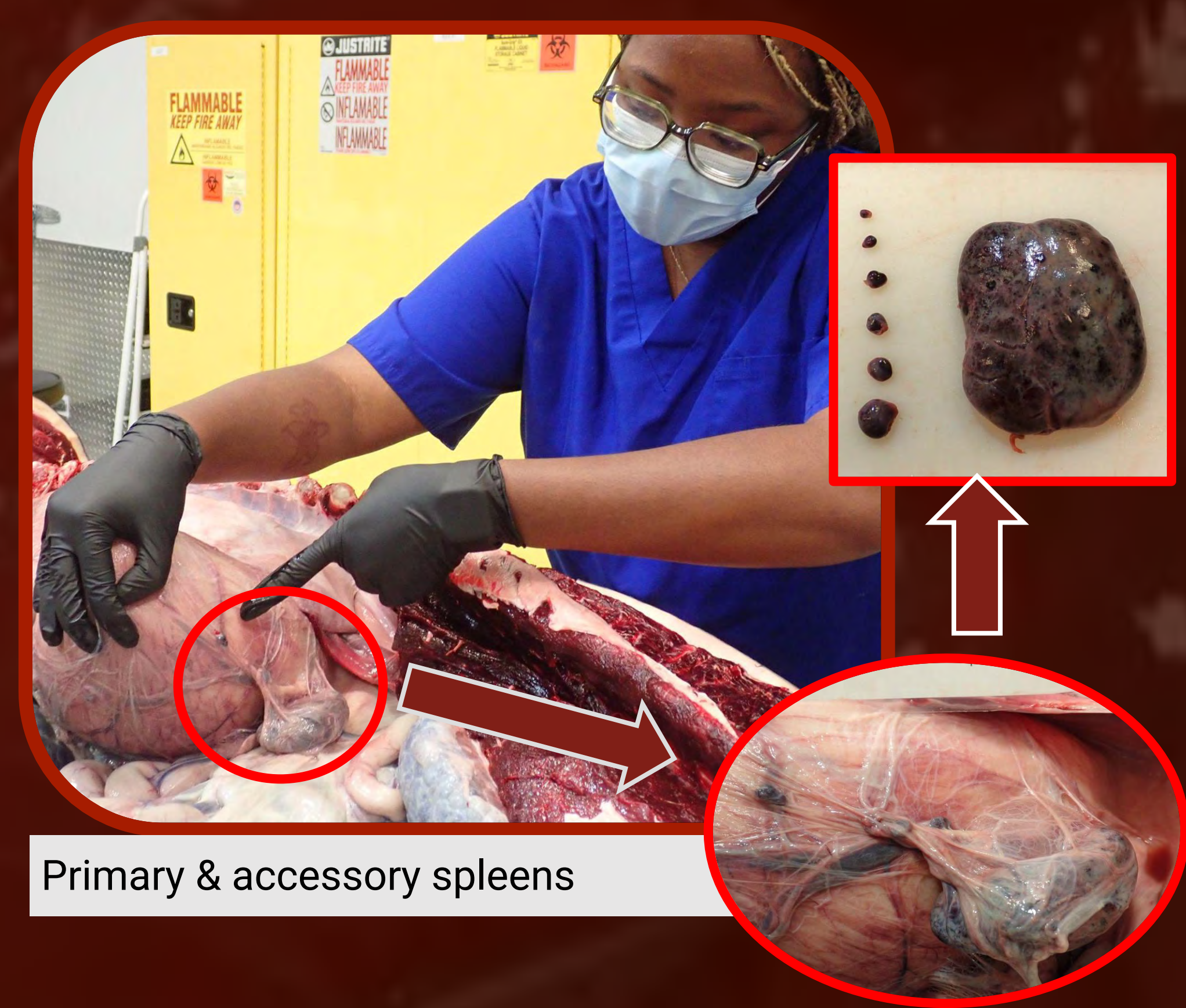


Data were extracted from the Alabama Marine Mammal Stranding Network (ALMMSN) database from 2011-2024.

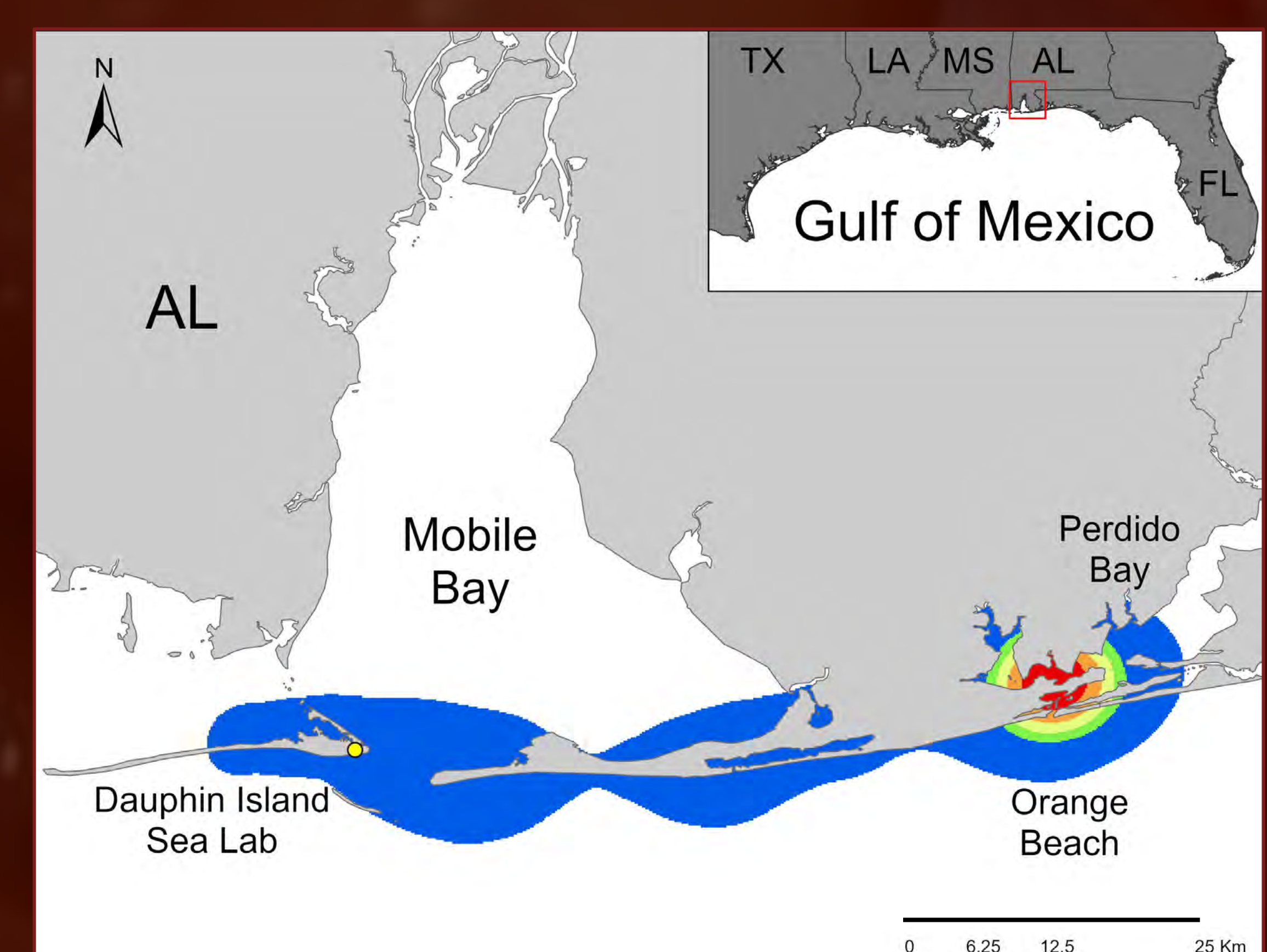
Data examined included:

- Necropsy & HI reports
- Histology reports
- Photographs

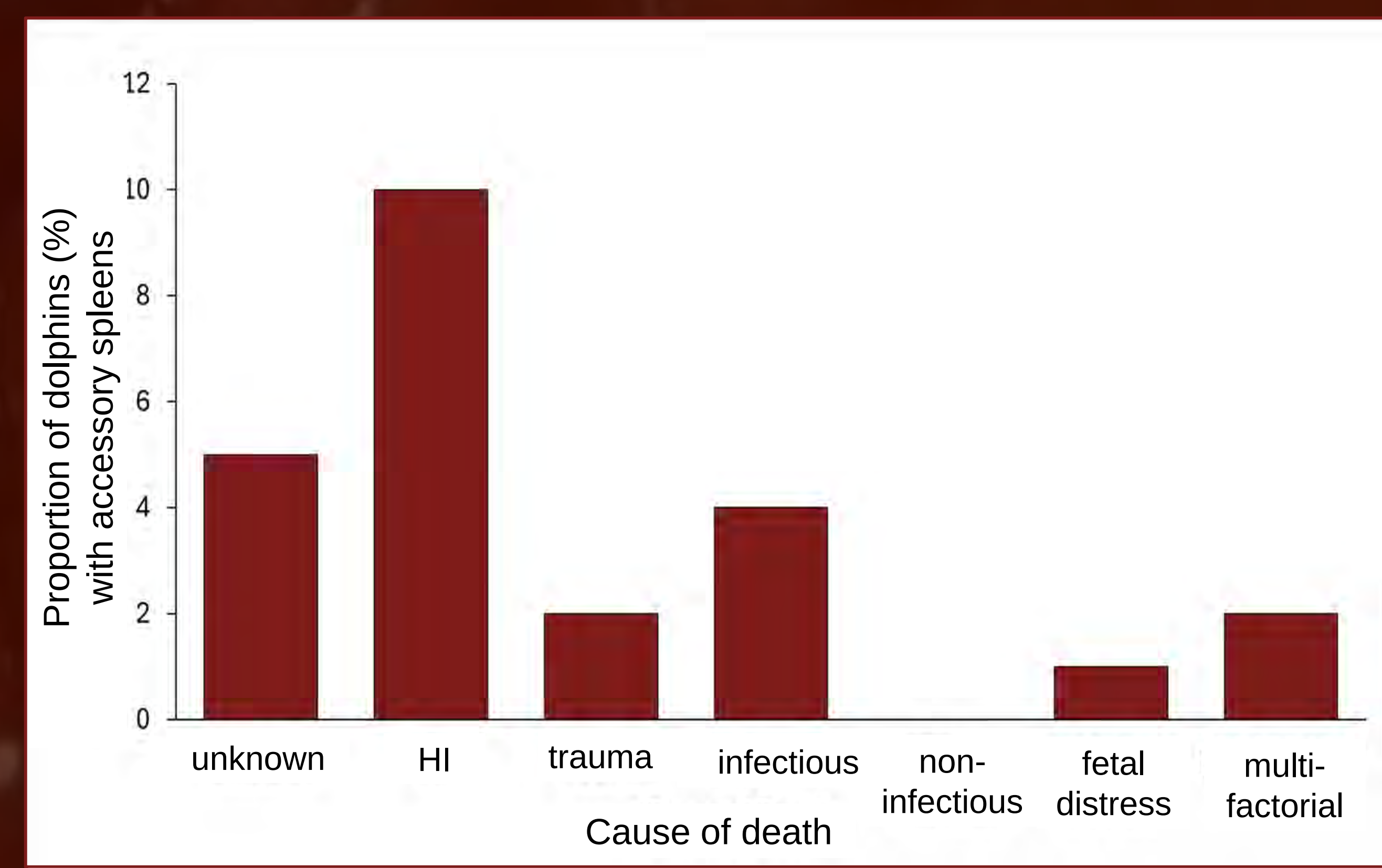
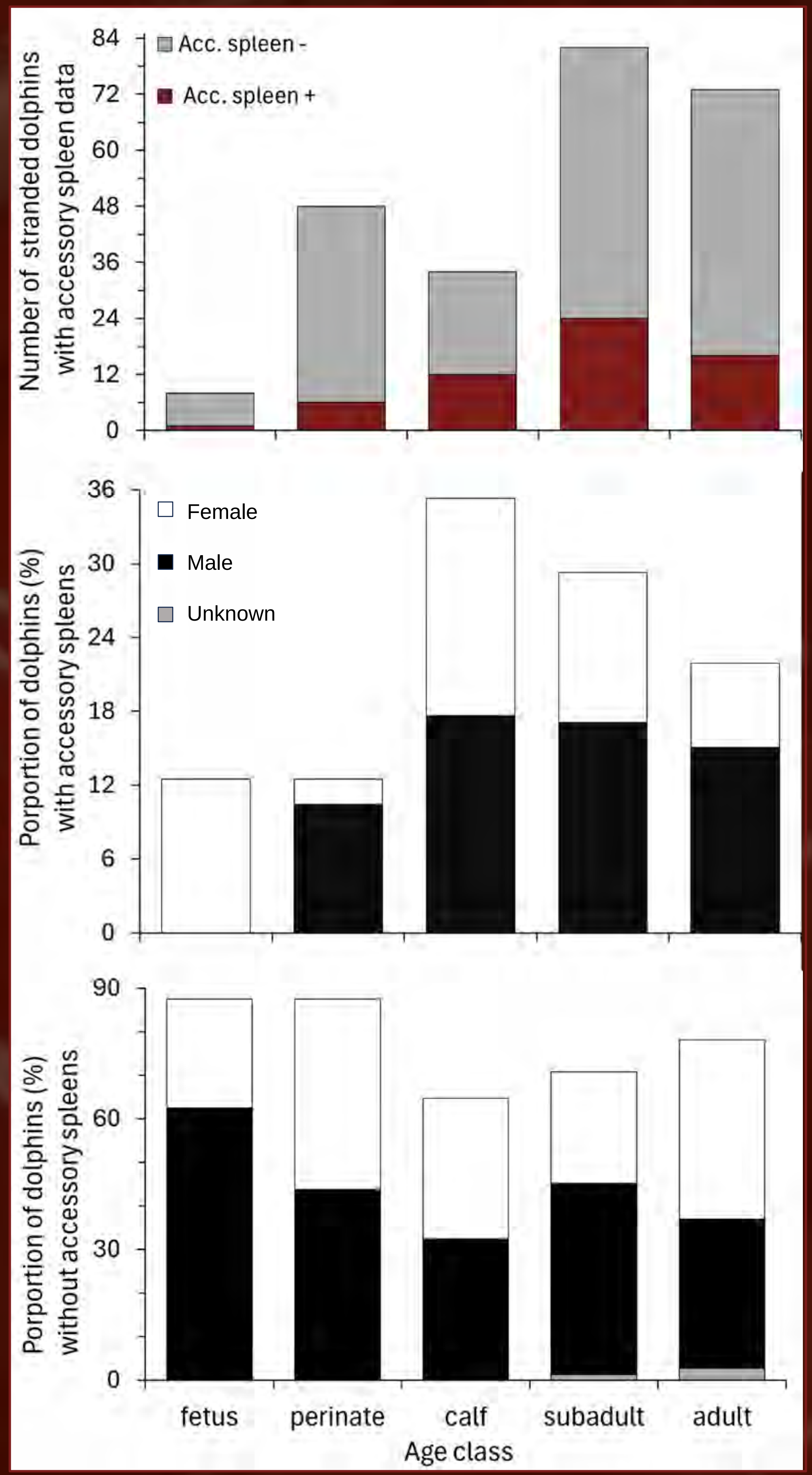
Results



- The proportion of stranded dolphins *without* accessory spleens was higher in all estuarine stressor categories (HI+/- = human interaction yes/no, CBD = cannot be determined, FW+/- = freshwater exposure yes/ no).
- Accessory spleens were more common among animals that did not experience known stressors (CBD,FW-).



- There was a hotspot of stranded dolphins *with* accessory spleens in the Orange Beach and Perdido Bay area.
- Genetic data (NOAA tech report; Wilcox et al. 2025) confirms there is a genetically distinct population in this area.

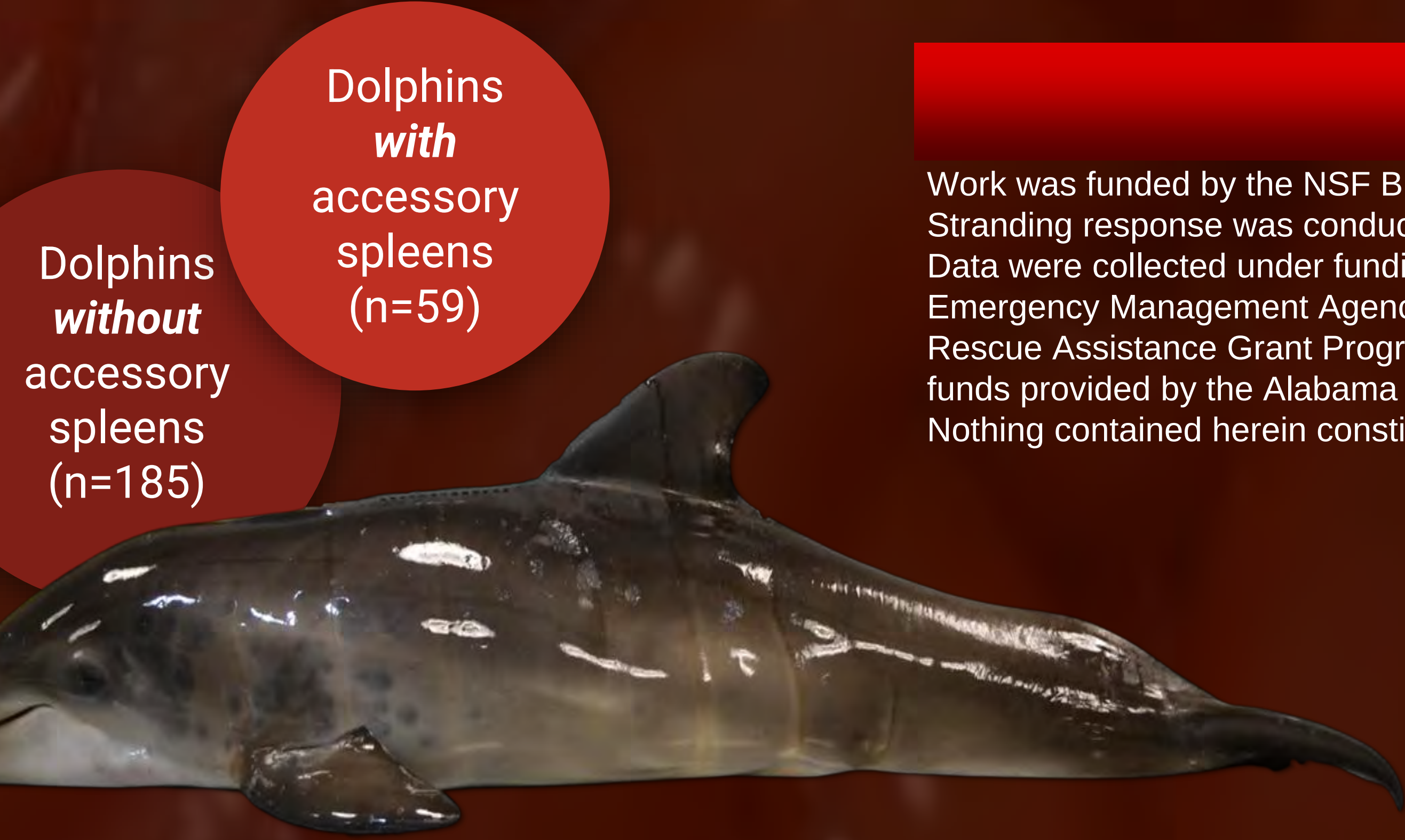


- The proportion of dolphins *with* accessory spleens was <10% for all causes of death.
- Dolphins *with* accessory spleens most often died due to HI, unknown causes and infectious diseases.
- Accessory spleens were more common among animals that did not experience multiple stressors.

Conclusions

- Stressors are unlikely to be drivers of accessory spleen development, but presence of accessory spleens could contribute to better survival in stressful estuarine habitats.
 - The hotspot in the Orange Beach/ Perdido Bay area suggests a possible genetic driver of accessory spleen presence.
 - More study is needed to determine if accessory spleen presence in dolphins (and other wildlife) is genetic and if they contributes to better immune function and survival.
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"Accessory spleen" image generated by Google Gemini.



Acknowledgements

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- 24% of dolphins for which accessory spleen data were available had accessory spleens (Acc. spleen+), ranging ~12-40% among age classes (top).
- Fetuses and perinates had lowest proportion *with* accessory spleens.
- Males and females were roughly equally represented in each age class.