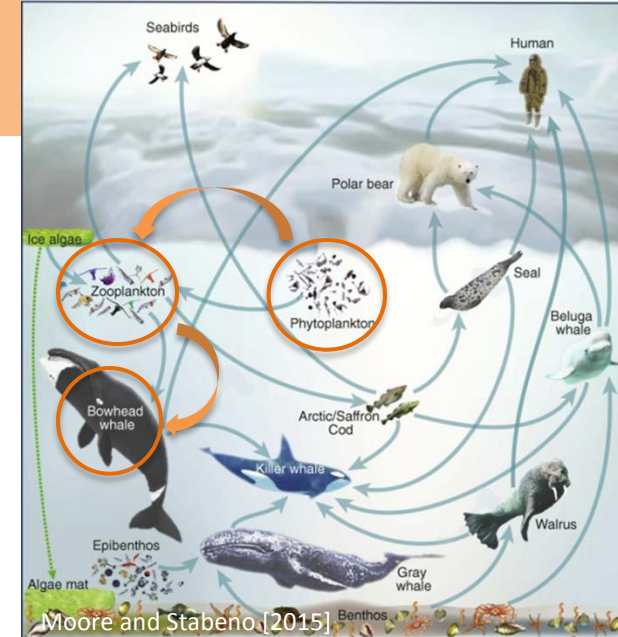


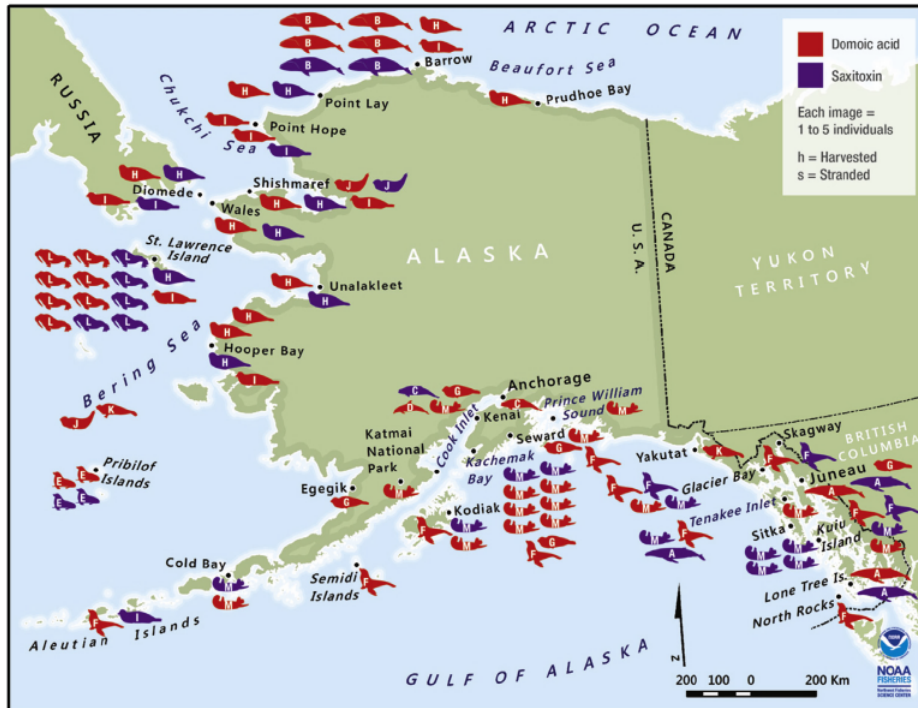


# Monitoring Harmful Algae Biotoxin Exposure in Bowhead Whales: Preliminary Findings

These findings were part of a statewide effort to better understand the prevalence of algal toxins in Alaskan Marine Mammals (Lefebvre, *et al.*, 2016). The biotoxins tested in this study, domoic acid (DA) and saxitoxin (STX), are produced by algae and are transferred through food chains. A large amount of biotoxin can enter the environment during algae “blooms,” and some are visible as “red tides.” Blooms, or growth spurts, often occur as the water is warming in the spring or summer and nutrients and sunlight are “suddenly” available. Some algae produce biotoxins which can be transferred to humans, the usual route being through shellfish. Shellfish poisoning in humans can cause vomiting, confusion, motor weakness, seizures, and in extreme cases, death. These biotoxins cannot be destroyed by freezing or cooking. In this study, twenty-five samples from bowhead whales harvested in Barrow between 2006-2011 were analyzed, and 17 samples tested positive for DA and eight were positive for STX.



Moore and Stabeno, [2015] Pathway of biotoxins, from algae (phytoplankton) to krill (zooplankton) to bowhead whale.



- A Humpback whales (s)
- B Bowhead whales (h)
- C Beluga whales (s)
- D Harbor porpoises (s)
- E Northern fur seals (s)
- F Steller sea lions (s)
- G Harbor seals (s)
- H Ringed seals (h)
- I Bearded seals (h)
- J Spotted seals (h)
- K Ribbon seals (h)
- L Pacific walrus (h)
- M Northern sea otters (s)

## RESULTS and CONCLUSIONS

- Levels of Domoic Acid (DA) and Saxitoxin (STX) found in feces of bowhead whales vary between years (2000-2017) but they are far below the FDA limits for seafood and are not a food safety concern.
  - Highest concentration of DA in bowhead = 359 ng/g  
Mean = 83 ng/g
  - FDA regulatory level of DA = 20,000 ng/g
  - Highest concentration of STX in bowhead = 63 ng/g  
Mean = 48 ng/g
  - FDA regulatory level of STX = 800 ng/g
- The effect of the algal biotoxins on whales is not known, so we have started a long-term study analyzing samples from 2002-2017 to better understand temporal trends in bowhead whales.
- Algal biotoxin monitoring of Arctic waters and of subsistence-harvested marine mammals is important as the ocean and climate continue to change.

Locations where algal toxins were detected in stranded and harvested marine mammals are positive for DA, purple images are positive for STX. (Lefebvre, *et al.*, 2016)

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