



TEXAS A&M UNIVERSITY
CORPUS CHRISTI

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- Marine biota are vulnerable to anthropogenic (human-caused) stressors that can result in injury or death.
- Anthropogenic stressors are prevalent in highly industrialized areas and could include heavy shipping traffic, pollution, and toxic water quality.
- Coastal Bend is currently the 3rd largest port in total tonnage in the USA. The Port of Corpus Christi is undergoing extensive dredging and expansion to increase future exports of crude oil.
- Common bottlenose dolphins (*Tursiops truncatus*) are bioindicator species, and can be used to gauge the health of an ecosystem.
- Exploration on the impacts of dredging on dolphins has been limited to one study, which showed that dolphins in Scotland reduced their foraging and residency when vessels were present.

1. Determine the habitat use and site fidelity of bottlenose dolphins in the Coastal Bend.
2. Overlay plots of preferred habitats with nearby anthropogenic stressors.
3. Assess the potential risk(s) to dolphins caused by anthropogenic stressors.

Dolphins have preferred habitats that overlap with anthropogenic stressors.

Photographs of individually distinctive dorsal fins collected between 2014 and 2020 will be used to determine:

1. **Habitat use:** Occurrences of dolphin sightings along boat survey routes will be plotted using ArcGIS, a geospatial mapping software (Figs. 1-2).
2. **Site fidelity:** The frequency of dolphin re-sightings at specific sites will be determined using GPS coordinates embedded in photo data.
3. **Anthropogenic stressors:** The presence of shipping lanes, wastewater treatment plants, and chemical plants will be overlaid onto the habitat use and site fidelity maps to determine the extent of dolphin exposure and to assess if individuals prefer these high risk areas (Figs. 4-7).



Fig.1: Transect routes for boat surveys in Corpus Christi Bay, Redfish Bay, Aransas Bay, and Copano Bay.

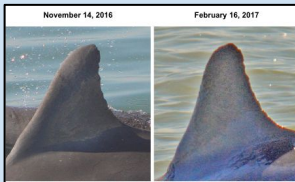


Fig. 3: Dorsal fin photographs of the same dolphin re-sighted on separate days (CCB380). The trailing edge of fins were traced, and markings and notches were compared to identify individuals. Photo collected under NMFS Permit No. 18881.

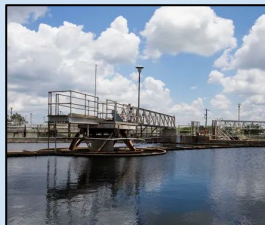


Fig. 5: Greenwood is one of the many wastewater treatment plants that will be mapped to the distance of dolphin sightings. Retrieved from <https://www.caller.com/story/news/local/2020/09/26/corpus-christi-makes-fixing-aging-wastewater-infrastructure-priority/3508521001/>



Fig. 2: The research boat used for photographing dolphins along the transect routes



Fig. 4: The Port of Corpus Christi has extensive traffic shipping lanes that will be mapped to the distance of dolphin sightings. Retrieved from <https://portofcc.com/capabilities/logistics/intercoastal-waterways/>



Fig. 6: Calpine is one of the many chemical plants that will be mapped to the distance of dolphin sightings. Retrieved from <https://www.calpine.com/operations/power-operations/plant-locations/CornusChristi>



Fig. 7: Bottlenose dolphins photographed with an anthropogenic stressor in the background (chemical plant). Photo collected under NMFS Permit No. 18881.

Results from this study will be used to inform conservation management to implement updated protection policies for this stock of dolphins and residential marine biota. This study will also help to identify if one particular stressor has a greater presence on the dolphin population, provide baseline data before an increase of dredging continues in Port Corpus Christi, and be informative for other regions looking into expansion.

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