You may use the information and images contained in this document for non-commercial, personal, or educational purposes only, provided that you (1) do not modify such information and (2) include proper citation. If material is used for other purposes, you must obtain written permission from the author(s) to use the copyrighted material prior to its use.
OBSERVATIONS ON THE OCCURRENCE AND DISTRIBUTION OF BOTTLENOSE DOLPHINS (TURSIOPS TRUNCATUS) IN UPPER GALVESTON BAY

Sherah Loe1, Kristi Fazioli2, Dr. George Guillen2
1University of Houston-Clear Lake, School of Science and Computer Engineering
2University of Houston-Clear Lake, Environmental Institute of Houston

Preliminary Findings

Background
Galveston Bay (GB) is the largest estuary in Texas, rests adjacent to the nation’s energy capital, and is located in one of the most populated regions of the state. The Houston Ship Channel (HSC) divides GB and is an avenue for heavy maritime traffic ending at the Port of Houston in the northwest. Consequently, GB has suffered degraded water quality due to anthropogenic influences. Current concerns include heavy metals, chlorinated organic compounds, and pathogenic bacteria, making GB a high priority for biological monitoring. Historically, common bottlenose dolphins (Tursiops truncatus) have been documented in lower GB, the Galveston Ship Channel and Bolivar Roads. Surveys conducted in the 1990’s suggested limited dolphin activity in upper GB. Until recently, no other surveys have been conducted in this region. Based on these previous studies and current observations, dolphins likely forage frequently in the HSC, the region most concentrated by toxic pollutants. Determining on these previous studies and current observations, dolphins likely forage frequently in upper GB. However, little is known about how the foraging locations and foraging habitats of these understudied dolphins impact their life history, foraging success, and assessing potential risks to the population.

Objectives
• Estimate dolphin distribution, relative abundance, site fidelity, and human interactions in upper GB
• Establish a long-term monitoring plan for the region

Methods
• Photo-identification (photo-id) surveys followed meandering routes conducted in upper GB & HSC (Fig. 1) using standardized protocols
• Photos analyzed following standardized methods & archived in FinBase
• Two seasons defined based on environmental conditions: Summer-Fall (SF): June–October
• Winter-Spring (WS): November–February
• Relative abundance= # of dolphins sighted (d) per kilometer (km) surveyed

Preliminary Results
• 13 surveys conducted from Mar. 2013 – Dec. 2014 covered 577 km, resulting in 54 group sightings containing 361 dolphins (Table 1)
• Identified 160 distinct individuals some with 2 or more sightings (n = 51)
• Dolphins sighted year round, however concentrations of dolphins sighted were higher in SF (p<0.025, Mann-Whitney U=31, one-tailed)
• Group size ranged from 1-31, with larger groups sighted during SF
• No significant difference in group size between season (p=0.055, Mann-Whitney U=376, one-tailed)
• 30% of groups sighted were patrolling around shrimp boats, 24% were bow riding on a vessel (Fig. 2)

Discussion
• Preliminary data suggests that dolphins regularly utilize the upper GB with a seasonal variation in abundance of dolphins in upper GB peaking in SF
• Dolphins often associate with vessels in upper GB & the HSC

Part of the Texas Bottlenose Dolphin Research Collaborative
A cooperative network of scientists & institutions facilitating the creation of a long-term monitoring program with goals to provide population distribution & abundance estimates, identify natural & human-generated risks and establish baseline health parameters for Texas bay, sound, estuary & near-coastal bottlenose dolphins.

Future Research

Objectives
• Estimate habitats used for foraging in the GB ecosystem
• Estimate proportions of different prey consumed by dolphins
• Delineate year-round residents & seasonal transients

Methods
• Conduct 10 photo-id surveys & 6 remote biopsy surveys per month from June 2015 – May 2016 following standardized protocols
• Compare δ13C & δ15N values to different sub-bays in GB using stable isotope analysis (SIA)
• Use previous published data on prey items & Bayesian mixing models (δ13C, δ15N) to estimate proportions of prey consumed
• Pair photo-id survey data and SIA results to estimate foraging areas & seasonal occurrences of individuals

Expected Results
• Dolphins with δ13C likely foraging in upper GB or Trinity Bay
• Dolphins with δ13C likely foraging in lower GB, or East/West Bay
• δ15N will vary depending on trophic levels consumed & location
• Transients will have depleted δ13C & enriched δ15N
• Estimate proportions of prey consumed using Bayesian models
• Photo-id survey data & SIA will reveal evidence of site fidelity

Discussion
As apex predators, bottlenose dolphins act as sentinels for the overall health of the GB ecosystem. My proposed research will contribute to basic life history knowledge of the GB population and identify key foraging habitats. My data will also be useful for future management plans by providing insight to prey selection and documenting bioaccumulated contaminants for ecosystem modeling.