# ESTABLISHING A RESEARCH FRAMEWORK AND BASELINE CONDITIONS TO SUPPORT ASSESSMENTS OF CUMULATIVE EFFECTS FROM MULTIPLE STRESSORS IN GALVESTON BAY DOLPHINS

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NOAA's Damage Assessment, Remediation, and Restoration Program and their co-trustees evaluate information on releases of hazardous substances into coastal environments for the purpose of natural resource damage assessment (NRDA) decision making. Houston area bottlenose dolphins (*Tursiops truncatus*) may be injured by releases of polychlorinated biphenyls (PCBs), dioxins and other contaminants. Addressing data gaps about how co-exposures may lead to cumulative effects would benefit the decision-making process. This 5-year NOAA RESTORE Science project will provide information on Houston area dolphins, including the: 1) current blubber burdens of PCBs and dioxins; 2) survival rates compared to other Southeast U.S. populations; 3) disease status based on epigenetic signatures; and 4) potential interaction (e.g., additive, synergistic, or antagonistic) between the toxic effects of dioxins and PCBs on the hypothalamus-pituitary-thyroid axis. To do this, our team is: 1) analyzing blubber samples from stranding cases and remote biopsy surveys, comparing the data to ranging patterns and across demographic groups; 2) conducting boat surveys to inform capture-mark-recapture analysis and compare survival rates to other populations in the Southeast U.S.; 3) collecting remote biopsy skin samples and analyzing epigenetic profiles to estimate biological age and disease status; and 4) conducting laboratory exposures with cell lines to better understand the dose-response relationships of dioxins alone, PCBs alone, and both chemicals together. The project team is co-producing statistical and conceptual models that can be updated based on additional data/assumptions that they or others may collect in the future. Thus, decision makers will be armed with scientifically-sound information to design more specific and targeted studies for their assessments, and anyone conducting risk assessments of other potential stressors in the Houston-Galveston area (e.g., the Bolivar Roads storm surge

barrier) will have more context to effectively evaluate cumulative effects to dolphins. The focus of our presentation will be to inform local stakeholders about the progress made to date and to request feedback to be incorporated during the remainder of the project and adaptive management process.