



Emerging Technologies for Detecting Aquatic Species

Dredging Operations Environmental Research Program (DOER)

U.S. ARMY CORPS OF ENGINEERS

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Problem

Under the legal requirements of the Endangered Species Act (ESA) of 1973 and the Marine Mammal Protection Act (MMPA) of 1972, no threatened and endangered (T&E) species or marine mammal may be “taken” (harassed, injured, or killed) by any federal activity, such as dredging or channel improvement. Within the continental United States, animals covered by ESA and MMPA that frequent Corps navigation projects include six of the nine species of North American sturgeon, five species of sea turtles, the Florida manatee, and dolphins. In terms of geography, these species are found from the US/Canadian border to the south Florida coast and throughout the entire Gulf of Mexico. Accordingly, this can be a significant impediment to Corps activities involving maintenance and enhancement of federal navigation channels in areas of these T&E species and marine mammal populations (Figure 1).



Figure 1. Florida manatee

Study Description

Researchers at the US Army Engineer R&D Center (ERDC) prepared and submitted a topic proposal to the Army Small Business Technology Transfer (STTR) Program to design, develop, and demonstrate a field-portable active acoustic-based sensor system to detect, track, and classify large aquatic animals in the immediate vicinity (~125m) of Corps navigation infrastructure facilities and maintenance operations. The STTR Program accepted topic titled, “Preserving Navigation Access for the War Fighter – Development of an Acoustic Marine Watch System to Support Corps Channel Maintenance and Enhancement Activities”, and the 7-year two-phase \$1,850K contract effort was begun on November 2012. Phase I consisted of a 6-month engineering design effort in which two contractors competed for the Phase II contract. After Phase I, a single vendor was down-selected to proceed with the 6-year \$1,750K integration, testing, and demonstration effort. Phase II field efforts are planned for the Port Canaveral, FL, area which has an abundance of manatees, sea turtles, and dolphins, and will be closely coordinated with clamshell dredging activities directed by the Jacksonville District Corps of Engineers (Figure 2).

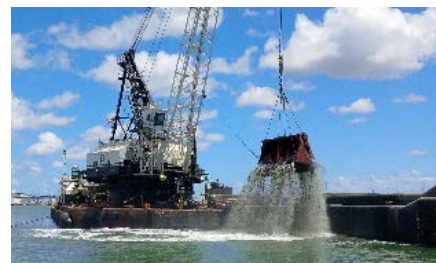


Figure 2. Bucket dredging

Products

The result of this work effort will be a prototype sensor system that will be available for deployment by the US Army Corps of Engineers. In addition, ERDC will have the opportunity to be involved in the evaluation and demonstration of the system toward the end of the STTR Phase II, which will result in publications describing the system and its use. Also, additional documentation is planned to generate operational guidance manuals for dredge operators as well as to examine other potential applications for the system.

Summary

ERDC has partnered with an Army military sponsored STTR program to leverage critical funding for this advanced sensor and detection algorithm development and testing effort. A small business technology firm is developing this active acoustic marine life watch system under contract, with technical oversight by ERDC and Jacksonville District Corps of Engineers personnel. The expected result of this effort is a field system that will provide real-time situational awareness of nearby T&E species during dredging and other Corps channel maintenance and enhancement activities (Figure 3).



Figure 3. Preparing transducer for deployment



Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.

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