



Implementation Strategies and Effectiveness Evaluation of Turtle Tickler Chains

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

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Problem

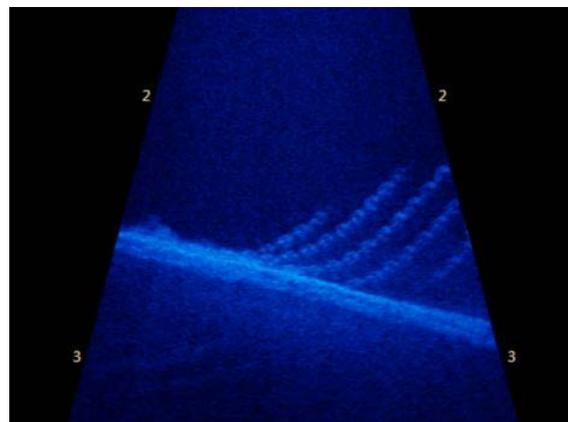
Threatened and endangered sea turtles may be incidentally entrained into a hopper dredge's draghead during coastal dredging projects. Over the past 36 years, numerous engineering and operational methods have been developed, tested, and implemented to protect sea turtles during hopper dredging projects along the US Atlantic and Gulf of Mexico coastlines. These protective measures have resulted in dramatic reductions in the rate of incidental take of sea turtles; however, because sea turtle takes have not been eliminated and protection requirements have a significant impact on U.S. Army Corps of Engineers (USACE) navigation projects, efforts continue to develop additional protective methods to minimize risk to sea turtles while maintaining optimal dredging production and efficiency. One protective measure used for some dredging outside the United States is a curtain of tickler chains hanging off the dragarm pipe ahead of the draghead. These turtle tickler chains (TTC) are designed to be dragged along the seafloor and startle or motivate a turtle on or near the seafloor to move away from the oncoming draghead and avoid a turtle entrainment. Unfortunately, the overseas projects have not provided verifiable documentation on this system's efficiency for either the equipment's performance or its effectiveness in protecting sea turtles.



A TTC was temporarily installed (under the DOER program) onboard USACE hopper dredge *ESSAYONS* while dredging in Hawaii and the system's performance was successfully demonstrated from the operational perspectives of: 1) feasible deployment on an active dragpipe (deployment/operation/retrieval), 2) the chain array's interaction in the water column (maintained design configuration and did not entangle to form a drowning risk for the turtles), and 3) the chain arrays interaction with the bottom sediment (maintained contact with the bottom and did not entangle). Given that success, the TTC now needs to be evaluated for its effectiveness to potentially provide an additional or alternative sea turtle protection method for US hopper dredging projects.

Study Description

Full-scale implementation strategies must be developed and extensive coordination among USACE, National Marine Fisheries Service (NMFS), dredging contractor project delivery team members, and other stakeholders must be done to facilitate opportunities to allow the use of a TTC so that its effectiveness in moving turtles away from the drag head can be evaluated and documented. Once a demonstration is allowed by the regulatory agencies, research task personnel will facilitate the logistics of this demonstration and design a monitoring plan that may involve the use of an acoustic camera (successfully used in Hawaii) to determine the TTC system's efficiency in moving turtles. Data collected during the demonstration will be analyzed, and results published and communicated to the regulatory agencies.



Products

The products that will be delivered from this research task will include TTC implementation strategies that, through stakeholder coordination research task efforts, will facilitate a demonstration project to occur. A TTC monitoring guidance document will be generated and applied during this demonstration and the subsequent data collected from this/these demonstration(s) will be analyzed, and synthesized into a technical report and several peer-reviewed journal articles.

Summary

Although a previous study demonstrated the feasibility for deploying the TTC and the underwater performance of the chains during dredging, it did not address the effectiveness of the chains to reduce incidental take of sea turtles. This research task will conduct the coordination between various stakeholders to arrange a TTC demonstration, and evaluations made to determine the effectiveness for the tickler chains to reduce incidental turtle takes. If TTCs are shown to be effective in protecting sea turtles during dredging projects, they may be a more cost-effective protection method than the currently used draghead deflector, and could be used in lieu of the deflectors.



*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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