

Migrating Atlantic sturgeon behavior around an active dredge operation in the James River, VA.



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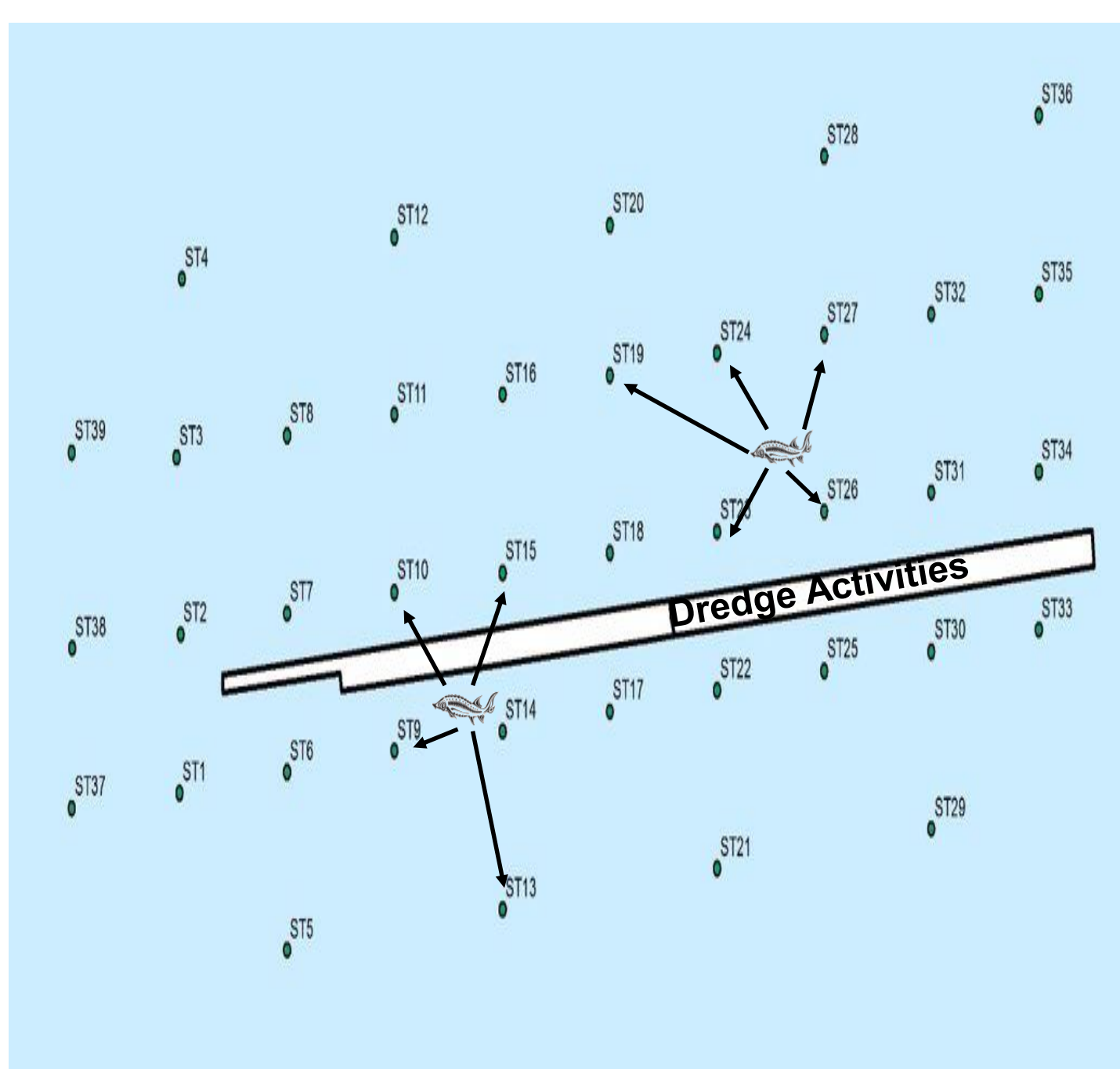
Background

Environmental windows are times of year when dredging is restricted due to environmental concerns. Windows are currently enforced in riverine areas along the east coast during the spring due to concerns of dredging impacts on anadromous fish spawning migrations. This regulation was enacted during the 1970s without supporting data showing if river dredging activities hinder anadromous fish runs. Atlantic sturgeon are an endangered anadromous species inhabiting the east coast of the U.S. Until recently, Atlantic sturgeon were thought to only spawn in the spring; however, new findings prove that there is also a group that spawns in the fall. Because of the fall spawning group, federal and state managers are considering expanding environmental windows to the fall season which would be very costly to districts that dredge riverine areas. The James River, VA is dredged annually during the fall and has a well documented fall spawning run of Atlantic sturgeon. To better understand how fall run Atlantic sturgeon migrating to spawning habitat react to dredging in a riverine environment, a Vemco Positioning System array was deployed around a cutterhead dredge operating in the James River. This research will help determine if dredging hinders migrating Atlantic sturgeon and if environmental windows are an effective conservation practice to have in place.

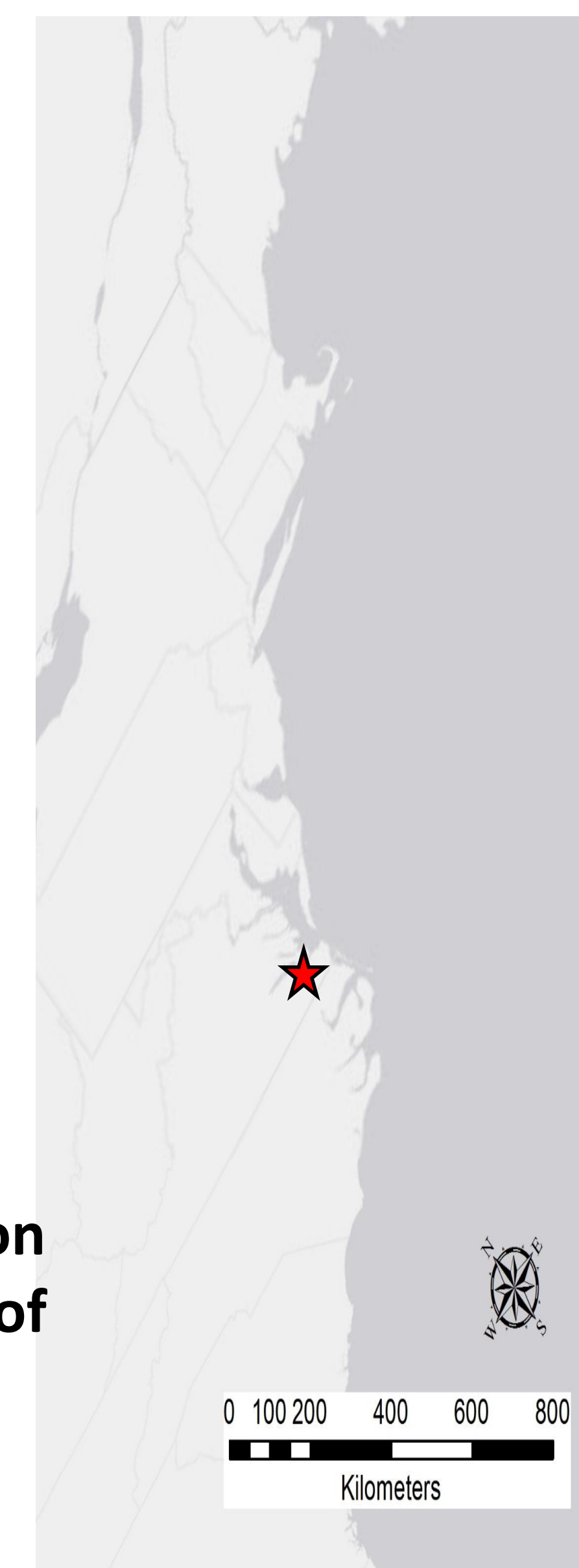
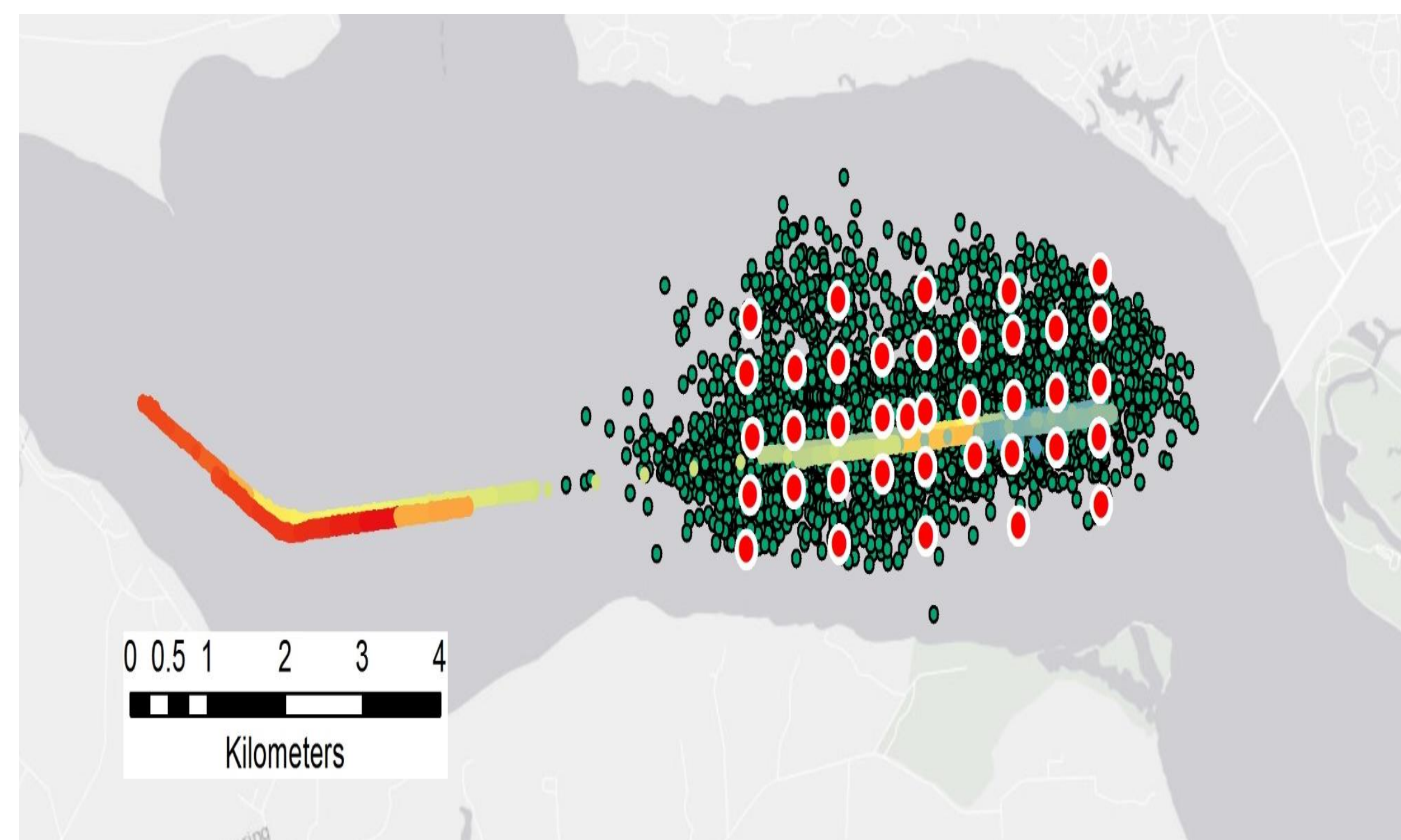
Vemco Positioning System Array



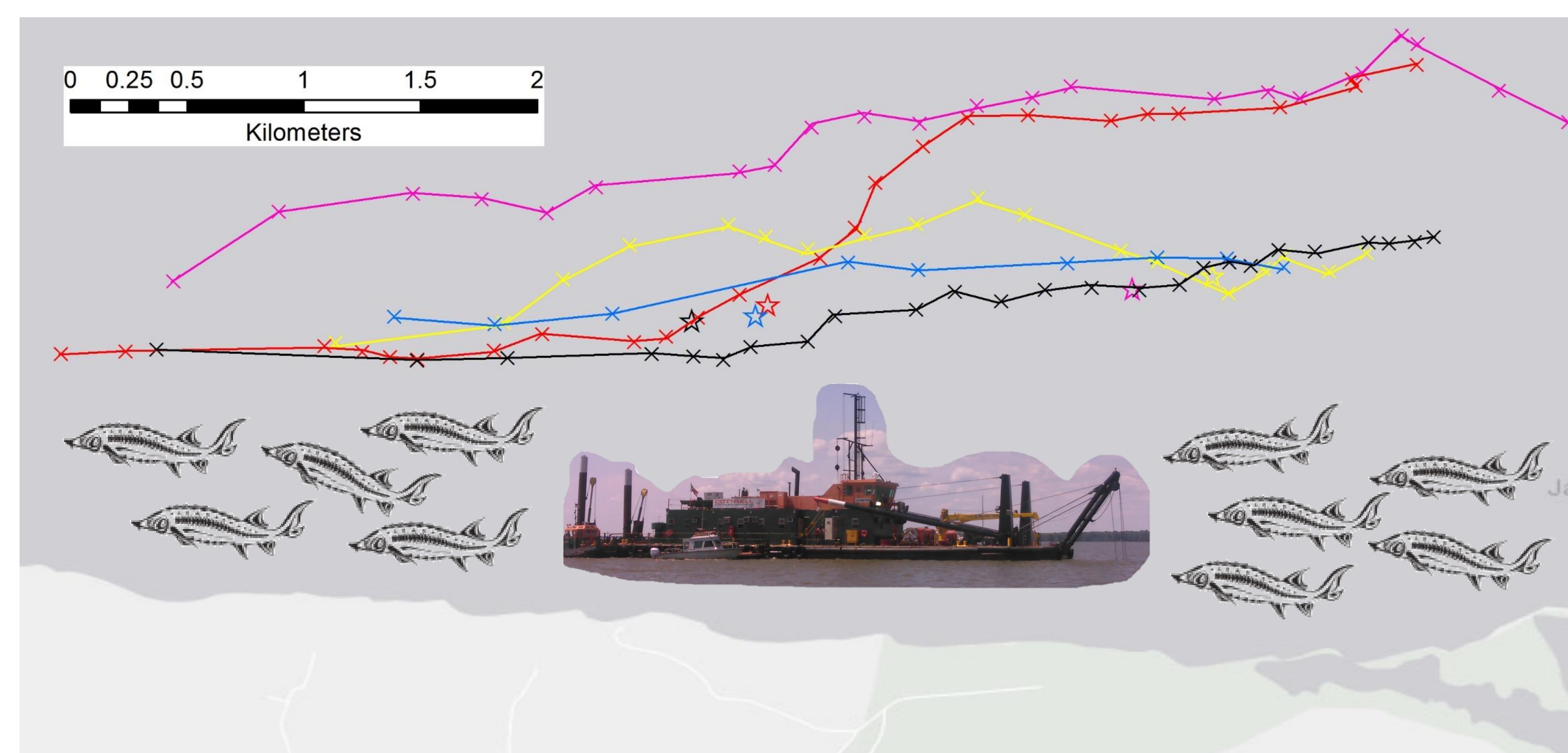
A Vemco Positioning System (VPS) utilizes trilaterization, very similar to satellite GPS, to provide up to 1-m X,Y and Z spatial positions for a tagged object in an aquatic environment. Over the past decade a partnership between ERDC, VCU, and USFWS has captured and tagged hundreds of Atlantic sturgeon in the James River, VA. The previous work provided a great foundation for the study. Using the telemetered animals and an understanding of life-history patterns we were able to conduct a first of its kind VPS study to elucidate fish behavior around an active dredge.



Project Results



During the study, 104 telemetered adult Atlantic sturgeon entered the study area and all were detected upstream of the active dredge area. Telemetered Atlantic sturgeon traversed the active dredge area 218 times without incident. One fish passed the dredge nine times during the spawning season. Data show that no fish aborted their spawning run upon encountering the active dredge. Male and female fish would pass the active dredge at various distances and there was no noticeable difference of upstream paths taken whether the dredge was absent or present.



Conclusions & Future Work

These results suggest that cutterhead dredging in this area of the James River does NOT make anadromous Atlantic sturgeon abort spawning migrations and expanding environmental windows into the fall is not warranted. Dredge operations have occurred during the fall-spawning season in the James River almost every year since 1990, yet the fall population is currently recovering better than most populations along the entire coast. The population was considered functional extirpated in the late 1990s and has rebounded to thousands. The partnership has captured over 700 unique fall run adults, almost all of which were spawned in years when fall dredging occurred. Future work would be to test if dredging hinders other species in the area that spawn only during the spring, such as shad and herring on the east coast of the U.S. If we show that riverine dredging does not hinder various anadromous species of concern maybe costly environmental windows may be removed. This VPS technology can be used for various studies such as testing the effectiveness of relocation and non-capture trawling, identifying how species react to various dredge types, observing movement at dams and fish passive devices and around contaminated sediment sites, developing fine-scale habitat preference/ suitability models, and mapping aquatic spatial/temporal positioning of objects of interest.



Further Information
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