

A case study of the effects of dredging in Narragansett Bay (RI, USA) on winter flounder eggs

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Seasonal dredging constraints have been established in several northeastern U.S. estuaries with the intent to protect winter flounder (*Pseudopleuronectes americanus*). A major source of concern is impacts on demersal eggs due to elevated sedimentation rates during the winter-early spring spawning season. To properly assess potential impacts of dredging on winter flounder eggs, results of specifically-designed egg burial studies must be coupled with predictions of egg distributions in the field in tandem with estimates of the extent and location of net dredging-induced deposition. We performed laboratory experiments in which recently fertilized eggs were exposed to fine-grained sediment. A trend of decreased hatching success and increased time to hatch with increasing depth of sediment relative to controls was observed. Percent total hatch of eggs exposed to ≤ 1 mm of sediment deposition was not statistically different from that of controls. Percent total hatch was highly variable in eggs buried in ~ 3 mm of sediment, while little or no hatch occurred in eggs buried in > 3 mm of sediment. Delayed hatch date was observed in eggs buried in as little as 1 mm of sediment. A case study was developed using 2004 dredging events in Narragansett Bay. Egg locations were predicted using information on newly-hatched larval winter flounder distribution, combined with measured egg distributions from other Northeast estuaries, and bay hydrodynamics. Model results of sediment deposition showed that little sediment (< 1 mm) was deposited onto the shallower flats where the eggs were predicted to be the most abundant. Results indicate relatively low risk that winter flounder eggs were detrimentally impacted in Narragansett Bay by this particular dredging event. Similar analyses should be performed using dredging project and site-specific information to predict whether or not dredging in other estuaries would pose a risk of detrimental effect on winter flounder spawning success.

Key words: Sedimentation; demersal fish eggs; dredging; management practices

Statement of purpose: The lack of information about the effects of sediment deposition on winter flounder eggs has led to the taking of a conservative approach to the protection of this species. Better information on the depth of deposition coming from this study should help regulators make better-informed decisions about management practices applied to dredging operations in the vicinity of winter flounder habitat.