

Thermal Effects on the Early Life-Stages of Shortnose and Atlantic Sturgeons

Chambers, R.C.¹, E.A. Habeck¹, K.M. Habeck¹, and I. Wirgin²

¹NOAA/NMFS/NEFSC Howard Marine Sciences Laboratory, 74 Magruder Road, Highlands, New Jersey 07732

²Department of Environmental Medicine, New York University School of Medicine, 57 Old Forge Road, Tuxedo, New York 10987

Shortnose and Atlantic sturgeons spawn in the upper reaches of estuaries along the Atlantic Coast where average spring / summer temperatures are expected to increase with global climate change. We address the impact of thermal regimes on sturgeon early life-stages (ELS) by subjecting embryos and pre-feeding larvae to a wide range of constant temperatures. Survival to hatch, embryonic period duration, and the size and condition of larvae at hatching were scored. Survival to hatch was maximal from 10 to 17 °C in shortnose sturgeon and 12 to 19 °C in Atlantic sturgeon with survival declining precipitously beyond these ranges. Developmental rate was linearly related to temperature but a reduction in hatch size (SL) occurred above 15 and 17 °C for shortnose and Atlantic, respectively. A change in yolk quantity with temperature mirrored the changes in SL. Results show these sturgeons to be at risk to direct effects of modest increases in their thermal habitat which may also magnify effects of other co-stressors. Our ability to implement a high number of temperatures that finely parse the total viable thermal regime provides a clear portrayal of the functional form of relationships between key ELS features and the thermal environment of these sturgeons.