

Proof-of-Concept of Environmental DNA Tools for Atlantic Sturgeon Management

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Atlantic Sturgeon is an anadromous fish that spawns in large, Atlantic Slope rivers from Canada to Florida. Multiple anthropogenic stressors resulted in major declines in abundance throughout the species' range. Population assessments based on conventional sampling methods may be challenging because traditional fishery-based gears like gillnets to collect Atlantic Sturgeon from endangered populations may be ineffective and potentially damaging to individuals. Environmental DNA (eDNA) is an indirect method for detecting rare, or invasive aquatic species by isolating nuclear or mitochondrial DNA (mtDNA) in water samples from putative habitats. We evaluated the potential of eDNA methods to document the presence, and density of Atlantic Sturgeon in the James River, Virginia. Novel qPCR primers were derived from a region of *Cytochrome Oxidase II*, and subject to quantitative PCR. This technique correctly identified Atlantic Sturgeon DNA and differentiated among other fishes co-occurring in the Lower James River, Virginia. Quantitative PCR indicated a DNA detection limit of 32.3 ug/L. A conventional sampling survey for Atlantic Sturgeon in the James River, Virginia during Fall, 2015 estimated 376 ug/L Atlantic Sturgeon biomass. Quantitative PCR indicated levels of biomass present during fall 2015 that are sensible given model estimates. Quantitative PCR sensitivity analysis and studies of the hydrology of the James River should be pursued to further define habitat utilization by local Atlantic Sturgeon populations.