

## Population Viability of Shortnose Sturgeon in the Gulf of Maine: How are Scutes Involved?

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The viability of shortnose sturgeon in the Gulf of Maine was examined using age-structured models parameterized with demographic data from studies in the Kennebec, Merrimack, and Penobscot Rivers. Models stabilized at abundance levels close to mark recapture estimates for all three rivers. Abundance estimates were most sensitive to changes in survival parameters and sex ratio. A simulated demographic disturbance in the Kennebec propagated through the Kennebec and Penobscot, resulting in a sharp decline in abundance and a recovery time to pre-disturbance levels of over 45 years. Abundance in the Merrimack River also declined but not as greatly and recovered relatively quickly. Additionally, the establishment of successful reproduction in the Penobscot River facilitated increased abundance in the Penobscot River and Kennebec Rivers. To begin improving model predictability with empirical data, we examined if chemical properties in scutes could elucidate river of origin and improve knowledge of early growth and survival. We observed putative annuli in scutes and variable element:calcium ratios (Sr:Ca, Ba:Ca, Mg:Ca) across the natal region of the scutes. These proof of concept results suggest dorsal scutes are useful for reconstructions of past habitat use with the potential to better inform assessments of population viability and use of critical habitats.