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**Determining thermal preferences and limits of fish and zooplankton species using trawl survey observations**

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**Abstract**

Geographic distributions of fish and zooplankton have been widely linked to temperature. While organisms may tolerate a range of temperatures, they do not thrive at the range extrema. Temperature exerts control over enzymatic function that in turn controls critical life processes such as growth, reproduction, and migration. To date most studies of thermal optima and extrema use controlled laboratory experiments. While this method allows the control of factors other than temperature, it is resource intensive and therefore few species’ thermal preferences are known. Furthermore, methodological differences contribute to varying results within species. It would be valuable - and perhaps more reliable - to calculate thermal optimums and limits from *in situ* data that is inherently subject to a range of ambient temperature scenarios over a time series. We hypothesized that it would be possible to derive species-specific thermal preferences and/or limits from survey data. Surveys along the United States Northeast continental shelf from Cape Hatteras, North Carolina up to Nova Scotia have collected fish and zooplankton abundances with paired temperatures since 1968 and 1977, respectively. Several methods (single parameter quotient, cumulative distribution function, and generalized additive model) were used to define ranges of thermal preferences and limits of several zooplankton and fish species. For each species, observationally derived temperature thresholds were compared to experimentally derived thresholds in the literature to determine which methods, if any, produced accurate results. Preliminary results suggest that the best methods vary across species.

**Keywords:** temperature, thermal preference, fish, zooplankton

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