



Abstract

# Inferring Past Occurrences of Diadromous Fish Species—The iPODfish Framework<sup>†</sup>

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**Abstract:** Historical information on diadromous fish species is commonly incomplete or truncated across the species distribution range and spatial scales. However, historical insights have proven to be very relevant for river management and conservation. The iPODfish is a new methodological framework that enables the inference of a more thorough representation of the historical occurrence of diadromous fish over their complete distribution range. The method is based on the interplay between freshwater network features, diadromous fish species ecology and known historical occurrence from which assumptions, rules and thresholds are derived. It has five steps: main river segments vs. tributary segments; segment specificities; relative distance threshold; strahler value threshold; and sub-basin strahler threshold, divided into 2 moments of application (tributaries after main river) and can be expressed by a tree-like representation. iPODfish can cope with data bias and deal with multiple sources of information with distinct resolution scales to generate historical pseudo-presence/absence records of diadromous fish at a fine-scale spatial unit, such as river segments and along river networks. It allows for the enlarging of diadromous fish historical distributions and could be applied in any river network throughout the globe because despite its inference nature, it remains a conservative approach that uses concepts and definitions derived from common features of diadromous ecology and freshwater networks. The outputs obtained may prove useful in biogeographical and/or macroecological studies using historical occurrences and targeting the conservation and management of diadromous fish species.

**Keywords:** data-informed methodology; freshwater ecology; species historical data; pseudo-absences; pseudo-presences; segment scale distribution



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