

# The practice and promise of temporal genomics for measuring evolutionary responses to global change

René Clark<sup>1</sup>, Katrina Catalano<sup>1</sup>, Kyra Fitz<sup>1</sup>, Eric Garcia<sup>2</sup>, Kyle Jaynes<sup>3</sup>, Brendan Reid<sup>1</sup>, Allyson Sawkins<sup>4</sup>, Anthony Snead<sup>5</sup>, John Whalen<sup>2</sup>, and Malin Pinsky<sup>1</sup>

<sup>1</sup>Rutgers University

<sup>2</sup>Old Dominion University

<sup>3</sup>Michigan State University

<sup>4</sup>University of California Santa Cruz

<sup>5</sup>The University of Alabama System

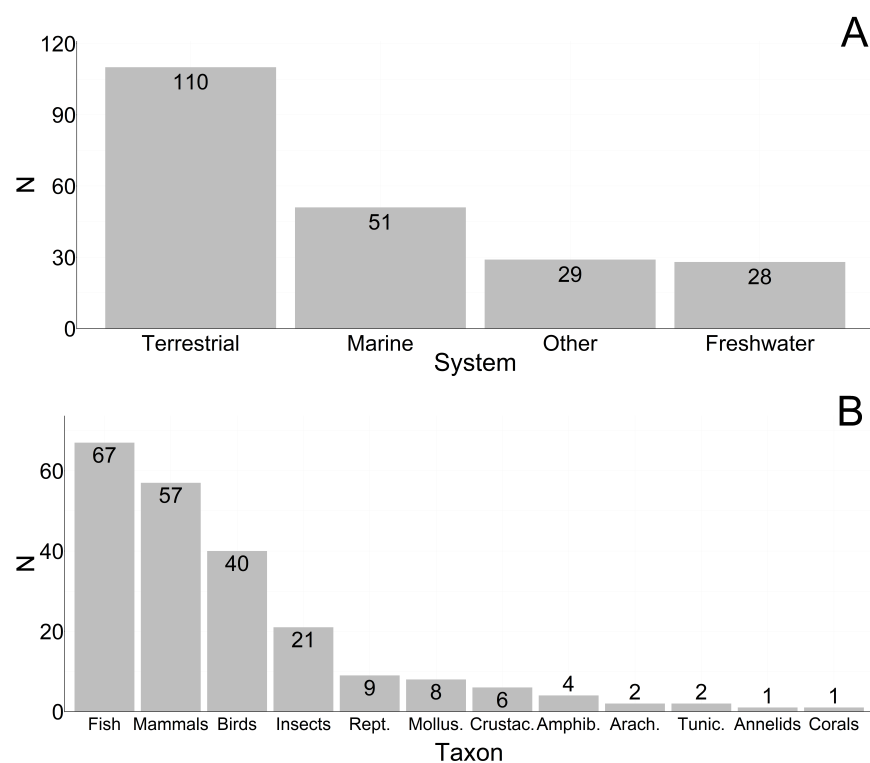
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## Abstract

Understanding the evolutionary consequences of anthropogenic change is imperative for estimating long-term species resilience. While contemporary genomic data can provide us with important insights into recent demographic histories, investigating past change using present genomic data alone has limitations. In comparison, temporal genomics studies, defined herein as those that incorporate time series genomic data, leverage museum collections and repeated field sampling to directly examine evolutionary change. As temporal genomics is applied to more systems, species, and questions, best practices can be helpful guides to make the most efficient use of limited resources. Here, we conduct a systematic literature review to synthesize the effects of temporal genomics methodology on our ability to detect evolutionary changes. We focus on studies investigating recent change within the past 200 years, highlighting evolutionary processes that have occurred during the past two centuries of accelerated anthropogenic pressure. We first identify the most frequently studied taxa, systems, questions, and drivers, before highlighting overlooked areas where further temporal genomic studies may be particularly enlightening. Then, we provide guidelines for future study and sample designs while identifying key considerations that may influence statistical and analytical power. Our aim is to provide recommendations to a broad array of researchers interested in using temporal genomics in their work.

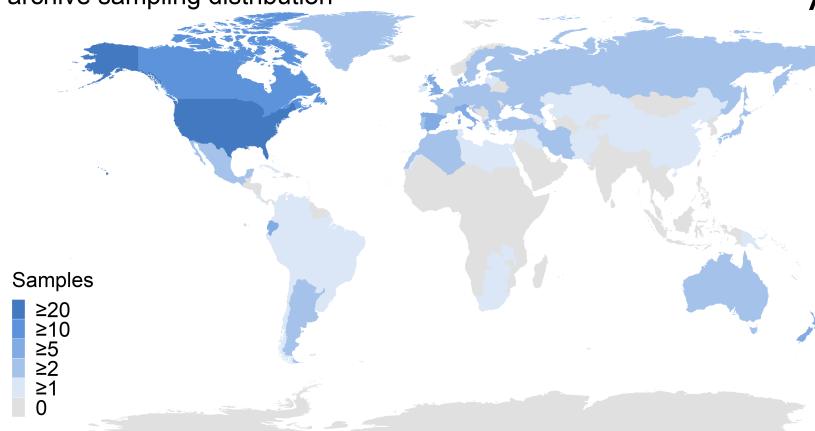
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