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TITLE: Ecological Change, Sliding Baselines and the Importance of Historical Data: Lessons from Combing Observational and Quantitative Data on a Temperate Reef Over 70 Years

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ABSTRACT:

Understanding the effects of environmental change on ecosystems requires the identification of baselines that may act as reference conditions. However, the continuous change of these references challenges our ability to define the true natural status of ecosystems. The so-called sliding baseline syndrome can be overcome through the analysis of quantitative time series, which are, however, extremely rare. Here we show how combining historical quantitative data with descriptive ?naturalistic? information arranged in a chronological chain allows highlighting long-term trends and can be used to inform present conservation schemes. We analysed the long-term change of a coralligenous reef, a marine habitat endemic to the Mediterranean Sea. The coralligenous assemblages of Mesco Reef (Ligurian Sea, NW Mediterranean) have been studied, although discontinuously, since 1937 thus making available both detailed descriptive information and scanty quantitative data: while the former was useful to understand the natural history of the ecosystem, the analysis of the latter was of paramount importance to provide a formal measure of change over time. Epibenthic assemblages remained comparatively stable until the 1990s, when species replacement, invasion by alien algae, and biotic homogenisation occurred within few years, leading to a new and completely different ecosystem state. The shift experienced by the coralligenous assemblages of Mesco Reef was probably induced by a combination of seawater warming and local human pressures, the latter mainly resulting in increased water turbidity; in turn, cumulative stress may have favoured the establishment of alien species. This study showed that the combined analysis of quantitative and descriptive historical data represent a precious knowledge to understand ecosystem trends over time and provide help to identify baselines for ecological management.

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