Supplementary Materials

We used our bibliometric data to analyze the disciplinary evolution of human pressure mapping based on existing literature. Relevant articles were obtained from the core collection of Web of Science (https://www.webofscience.com/, accessed on September 30, 2024) with data from January 1, 1980 to June 30, 2024. Articles were screened from the core collection using the criteria " TS= ("human pressure$" OR "human disturbance$" OR "human influence$" OR "human stress$" OR "human footprint$" OR "human modification$" OR "human threat$" OR "human activit*" OR "anthropogenic disturbance$" OR "anthropogenic pressure$" OR "cumulative human") AND TS=("protected area$" OR "protected landscape$" OR "protected site$" OR "natur* reserve$" OR "national park$" OR "regional park$" OR "national reserve$" OR "biological reserve$" OR "biosphere reserve$" OR "regional reserve$" OR "wilderness area$" OR "natural monument$" OR "management area$" OR "world heritage site$"), Document Types = Articles, Languages = English". After deleting duplicates, 5779 articles related to human pressure mapping for nature conservation were obtained. Although land use mapping is an important component in the development of human pressure mapping, due to the broad scope of land use science research, we were unable to include it in our search. Based on the search results, it is evident that there has been significant advancement and development in human pressure mapping since 2008.

To identify relevant studies, we applied two inclusion criteria and two exclusion criteria to narrow down relevant studies from the 5779 articles: use spatial proxies as human pressure (inclusion criteria 1) that applied for biodiversity conservation actions (inclusion criteria 2). We excluded articles that solely focused on individual human pressure without comprehensive meaning, such as urban expansion leading to habitat loss, and road development fragmentation (exclusion criteria 1). We also excluded studies that did not provide substantial insights into nature conservation, such as those that focused solely on the correlation between ecosystem services and human activities without offering deeper analysis (exclusion criteria 2). After screening the titles, abstracts, and texts of 5779 articles, 591 publications were included in this study (Figure 1).

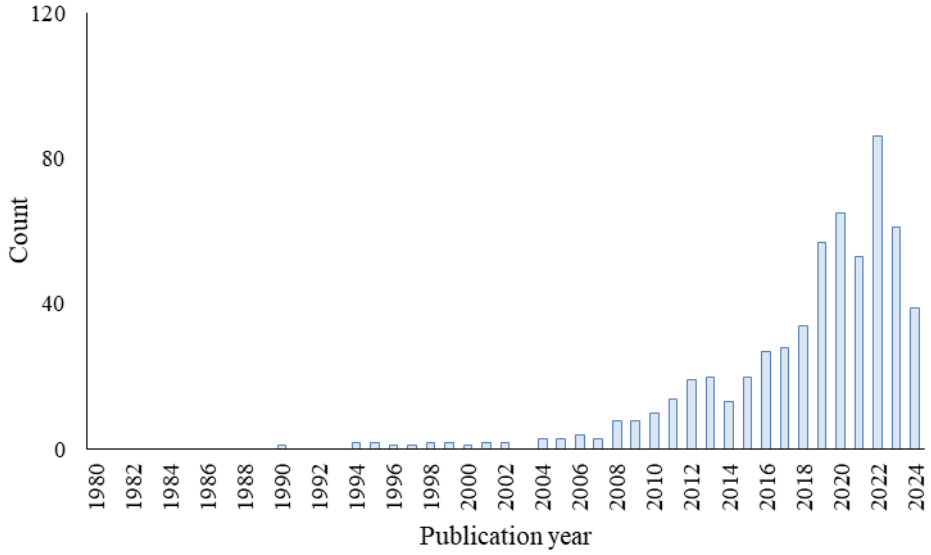


Figure S1 Number of publications on human pressure mapping literature

Since this review does not conform to the standards of a systematic review and meta-analysis, we did not strictly adhere to previously established checklists for assessing the strength of evidence in ensuring the quality of selected papers. Instead, we only applied the first three questions from the checklist and ensured that the final included papers addressed these questions in the analysis:

1)Does the study address a clearly focused question?

2)Does the question match the answer?

3)Was the population/area of interest defined in space, time and size?

Furthermore, the reliance on summarizing existing screening papers inevitably introduces potential biases. First, although this study provides valuable empirical evidence for the human pressure application for biodiversity conservation, it should not be considered comprehensive. Second, despite employing a wide range of potential keywords associated with human pressures, these terms were limited to representing comprehensive human pressures and may not encompass all relevant keywords. The reviewed literatures were published in English, but relevant studies might exist in other languages, such as Portuguese, French and Chinese. While we are confident that our search process effectively identified relevant international literature on the subject, the selection of keywords and language constraints may introduce biases, particularly regarding geographical representation. Therefore, we recommend cautious interpretation of our review's findings.