nature portfolio

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Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed	
☐	☒	The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒	The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☒	☐	A description of all covariates tested
☐	☒	A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒	A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒	For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐	For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐	For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐	Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	No computer code software was used
Data analysis	Statistical analysis was performed using IBM SPSS Statistics v27; Digitising and spatial visualisation were completed using QGIS software version 3.24.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

The data that support the findings of this study are available in Figshare with the identifier https://doi.org/10.6084/m9.figshare.c.6884167.v1. The world register of marine species (WoRMS: https://www.marinespecies.org/) and Marine Life Information Network (MarLIN https://www.marlin.ac.uk/) databases are publicly

available. The European Environment Agency's 'Europe coastline' shapefile was used to derive European coastline boundaries. The Eurostat shapefile 'Countries 2020' was used to derive European country boundaries (EEA 2017).

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

Reporting on sex and gender	Not applicable to this study - this information has not been collected
Population characteristics	Not applicable to this study
Recruitment	Not applicable to this study
Ethics oversight	Not applicable to this study

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences   ☐ Behavioural & social sciences   ☒ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	Use of archival records to document historical oyster (Ostrea edulis) reef presence across its biogeographic range, its form and extent and associated species present. We used qualitative data (descriptions, presence of species) to identify locations of and characteristics of a past ecosystem
Research sample	Locations of oyster fisheries or oyster reefs were extracted from historical written sources extracted from public libraries and other archives (e.g. government, university archives). Sources were identified via searches of library or archive catalogues for 'oyster' and 'Ostrea edulis', with search terms also including regional and local name variations across European countries.
Sampling strategy	Sampling strategy was dependent on historical sources existing in archival collections and being able to be found via keyword searches described above. Mapping the locations of past oyster habitat as data were submitted enabled the identification of gaps and precipitated further targeted searches.
Data collection	Authors collated data for their country or region of expertise, with data further collated and checked by Thurstan and zu Ermgassen (lead authors)
Timing and spatial scale	Sampling of archival collections took place between June 2020 and June 2023. The earliest publication used in our sample was published in 1524 and the latest in 2022. The sampling of archival data encompasses the biogeographic (native) range of the flat oyster.
Data exclusions	Due to our focus on mapping historical reef systems, records that identified individual or very low numbers of oysters were excluded from analysis, as were records where the abundance or original location of past oysters was unclear. Locations or structures built to facilitate oyster culture were discarded. Records were excluded if the species of oyster was unlikely to be O. edulis. These exclusion criteria were pre-established based on author knowledge of historical records and aimed at increasing the confidence of our findings for locations where reef habitat was historically present.
Reproducibility	All data records will be made publicly available as will the original source references.
Randomization	Not relevant due to archival/qualitative nature of data
Blinding	Blinding was not possible as cross-referencing of historical sources is key to interpreting their meaning and understanding potential biases of the source and hence our prescribed level of confidence in historical recordings

Did the study involve field work?   ☐ Yes   ☒ No

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems	Methods

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging