

Reporting Summary

Nature Research 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 Research policies, see [Authors & Referees](#) and the [Editorial Policy Checklist](#).

Statistical parameters

When statistical analyses are reported, confirm that the following items are present in the relevant location (e.g. 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
- ☐ ☒ An indication of 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 statistics 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
- ☐ ☒ Clearly defined error bars
State explicitly what error bars represent (e.g. SD, SE, CI)

Our web collection on [statistics for biologists](#) may be useful.

Software and code

Policy information about [availability of computer code](#)

Data collection

Species data were downloaded from Gentry et al. (2017) from the KNB: Knowledge Network for Biocomplexity data repository, model outputs for sea surface temperature and chlorophyll were obtained through the National Oceanic and Atmospheric Administration (NOAA) Climate Change Web Portal, and model outputs for ocean acidification were provided by Woods Hole Oceanographic Institution.

Data analysis

All analyses were performed in R v3.4.1. Computer code and data products reported in the paper will be publicly accessible on the KNB: Knowledge Network for Biocomplexity data repository. We will provide the associate DOI in the returned proofs.

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/reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [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 list of figures that have associated raw data
- A description of any restrictions on data availability

Computer code and data products reported in this are publicly accessible on the KNB: Knowledge Network for Biocomplexity data repository (DOI INSERTED HERE).

Field-specific reporting

Please select 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/authors/policies/ReportingSummary-flat.pdf](https://www.nature.com/authors/policies/ReportingSummary-flat.pdf)

Ecological, evolutionary & environmental sciences study design

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

Study description	We model and map the effect of warming oceans conditions (RCP 8.5) on marine aquaculture production potential over the next century. We use global ensemble model projections (historic – 2090) of sea surface temperature (RCP 8.5, 27 models), primary production (total chlorophyll, 14 models), and ocean acidification (OA, aragonite saturation Ω , CCSM3 model) to map the multispecies Growth Performance Index (Φ').
Research sample	Production potential of marine culture species is based on thermal tolerance and growth data of 180 cultured finfish and bivalve species. Model projections span 1985-2090.
Sampling strategy	NA
Data collection	Species data were from Gentry et al. (2017) from the KNB: Knowledge Network for Biocomplexity data repository, model outputs for sea surface temperature and chlorophyll were obtained through the National Oceanic and Atmospheric Administration (NOAA) Climate Change Web Portal, and model outputs for ocean acidification were provided by Woods Hole Oceanographic Institution.
Timing and spatial scale	Model outputs span 1985-2090, globally.
Data exclusions	NA
Reproducibility	Computer code and data products reported in this are publicly accessible on the KNB: Knowledge Network for Biocomplexity data repository.
Randomization	NA
Blinding	NA

Did the study involve field work? ☐ Yes ☒ No

Reporting for specific materials, systems and methods

Materials & experimental systems

- | n/a | Involved in the study |
|-------------------------------------|--|
| ☒ | ☐ Unique biological materials |
| ☒ | ☐ Antibodies |
| ☒ | ☐ Eukaryotic cell lines |
| ☒ | ☐ Palaeontology |
| ☒ | ☐ Animals and other organisms |
| ☒ | ☐ Human research participants |

Methods

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