

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

Shark satellite tracking: Raw location data from pop-off satellite archival transmitters (PSATs) processed after ARGOS satellite acquisition using tag manufacturers custom software (Wildlife Computers; Microwave Telemetry; Desert Star Systems) to calculate latitude and longitude. Raw positions processed using a UKFSST state space model (UKFSST R package). Raw ARGOS tag locations after satellite acquisition were processed with a speed filter (in R). For both tag types (PSAT and ARGOS), daily time series of locations estimated using a continuous time correlated random walk (CTCRW) Kalman filter (crawl R package). TOPP tag data was filtered with a Bayesian based state space model using WinBugs (for priors and MCMC sampling see Methods).
Fishing vessel tracking: Processed data were acquired from the Global Fishing Watch. for code and processing details see ref. 19 in paper.

Data analysis

R, Minitab v18 and ArcGIS

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

The source code used to undertake analyses and to prepare figures, in addition to the derived data in spreadsheet form underlying Fig. 2 maps (shark relative spatial density; longline fishing effort; and shark– longline overlap and FEI) and Fig. 3 plots (spatial overlap and FEI) are freely available to download on GitHub (github.com/GlobalSharkMovement/GlobalSpatialRisk). Processed fishing vessel effort data are available to download at <http://globalfishingwatch.org/datasets-and-code/>

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

Ecological, evolutionary & environmental sciences study design

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

Study description	The study describes the distributions of satellite tracked pelagic sharks and fishing vessels across the global oceans and calculates the extent of overlap and fishing effort different shark species are exposed to in space and time. See Methods for time periods of data collection.
Research sample	Movements of individual pelagic sharks were satellite tracked (n = 1804) from 23 threatened species in the Atlantic, Pacific and Indian oceans. Species details including number and locations of tags deployed on each species are given in the paper. Fishing vessels (n > 80,000) were tracked globally using the automatic identification system. These data were downloaded from Global Fishing Watch.
Sampling strategy	Pelagic sharks were captured alive at sea with baited hooks or with purse seines prior to tagging and subsequent release. Some sharks were tagged while free swimming. Tags were fitted externally within a few minutes. Tagging was undertaken by 30 different research groups across many countries with tagging procedures approved by institutional ethical boards and conforming to national regulations.
Data collection	Each research group collected shark track data independently by download from the ARGOS satellite service provider.
Timing and spatial scale	Pelagic sharks were tracked between 2002 and 2017. Details of tag deployments and tracking durations are detailed in the paper.
Data exclusions	Poor quality data were reported for 123 tags (72 ARGOS and 51 PSATs) due to early tag failure, premature tag pop-off and/or a high percentage of locations estimated with high spatial error, e.g. raw computed geolocations over land, all of which resulted in poor state space model fits and hence short or unreliable track reconstructions. These data were excluded.
Reproducibility	No experiments as such were conducted, rather our data are based on satellite tracked movements of individual pelagic sharks and fishing vessels.
Randomization	Randomization procedures were used and are fully described in the Methods and Supplementary Information files.
Blinding	Blinding is not relevant to this type of study because data are based on movements of wild animals and fishing vessels.
Did the study involve field work?	☒ Yes ☐ No

Field work, collection and transport

Field conditions	Tags were deployed on pelagic sharks in the Atlantic, Pacific and Indian Oceans under a range of conditions.
Location	Locations of tagging and subsequent tracks of sharks are detailed in the paper (Fig. 1; Extended Data Fig. 1).
Access and import/export	No collections or import or export of samples was undertaken.
Disturbance	Disturbance to individual shark behaviour was minimised through completion of tagging procedures within a few minutes if captured, or during free swimming. All procedures were approved by institutional and national ethical review committees.

Reporting for specific materials, systems and methods

Materials & experimental systems

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

Methods

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

Animals and other organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research

Laboratory animals

N/A

Wild animals

Satellite tags were fitted to individuals from 23 species of pelagic shark when captured or free swimming. Detailed information is provided in the Methods. All captured sharks were released after tag attachment. None were killed as part of the study. Tag release locations are given in Extended Data Fig. 1.

Field-collected samples

N/A