

SUPPLEMENTARY MATERIALS

Supplementary Code 1 | R script implemented for data collection, curation, and management, along with model implementation. [Provided upon request].

Supplementary Folder 1 | Folder with curated occurrence datasets and background points used in the present analysis. [Provided upon request].

Supplementary Folder 2 | Folder with details regarding predictor variable contribution to models and model evaluation. [Provided upon request].

Supplementary Folder 3 | Folder with high resolution raster projections of habitat suitability and net changes in habitat suitability relative to the present day. [Provided upon request].

Supplementary Table 1 | Details regarding the final set of predictor variables.

Variable	Primary source	Bio-oracle
Maximum depth of the seafloor (m)	GEBCO URL: http://gebco.net EMODnet Bathymetry URL: http://www.emodnet-bathymetry.eu/	Version 1.0
Minimum mass concentration of chlorophyll at the sea surface (mg/m ³)	Global Ocean Biogeochemistry NON ASSIMILATIVE Hindcast (PISCES) URL: http://marine.copernicus.eu/	Version 2.1
Range of mass concentration of chlorophyll at the sea surface (mg/m ³)	Global Ocean Biogeochemistry NON ASSIMILATIVE Hindcast (PISCES) URL: http://marine.copernicus.eu/	Version 2.1
Minimum current velocity at the sea surface (m/s)	Global Ocean Physics Reanalysis ECMWF ORAP5.0 (1979-2013) URL: http://marine.copernicus.eu/	Version 2.1
Range of surface current velocity (m/s)	Global Ocean Physics Reanalysis ECMWF ORAP5.0 (1979-2013) URL: http://marine.copernicus.eu/	Version 2.1
Mean sea surface salinity (PSS)	Global Ocean Physics Reanalysis ECMWF ORAP5.0 (1979-2013) URL: http://marine.copernicus.eu/	Version 2.1
Range of sea surface salinity (PSS)	Global Ocean Physics Reanalysis ECMWF ORAP5.0 (1979-2013) URL: http://marine.copernicus.eu/	Version 2.1
Maximum sea surface temperature (°C)	Global Ocean Physics Reanalysis ECMWF ORAP5.0 (1979-2013) URL: http://marine.copernicus.eu/	Version 2.1
Range of sea surface temperature (°C)	Global Ocean Physics Reanalysis ECMWF ORAP5.0 (1979-2013) URL: http://marine.copernicus.eu/	Version 2.1

Supplementary Table 2 | Details regarding the species records used in this study.

Species	Initial	Curated	Filtered	Background	AUC ($\bar{x} \pm \text{SD}$)
<i>S. lewini</i> ^A	2599	1504	963	1284	0.74 $\pm$ 0.01
<i>S. zygaena</i> ^B	1114	844	509	995	0.82 $\pm$ 0.02
<i>S. mokarran</i> ^C	741	557	329	1047	0.85 $\pm$ 0.02

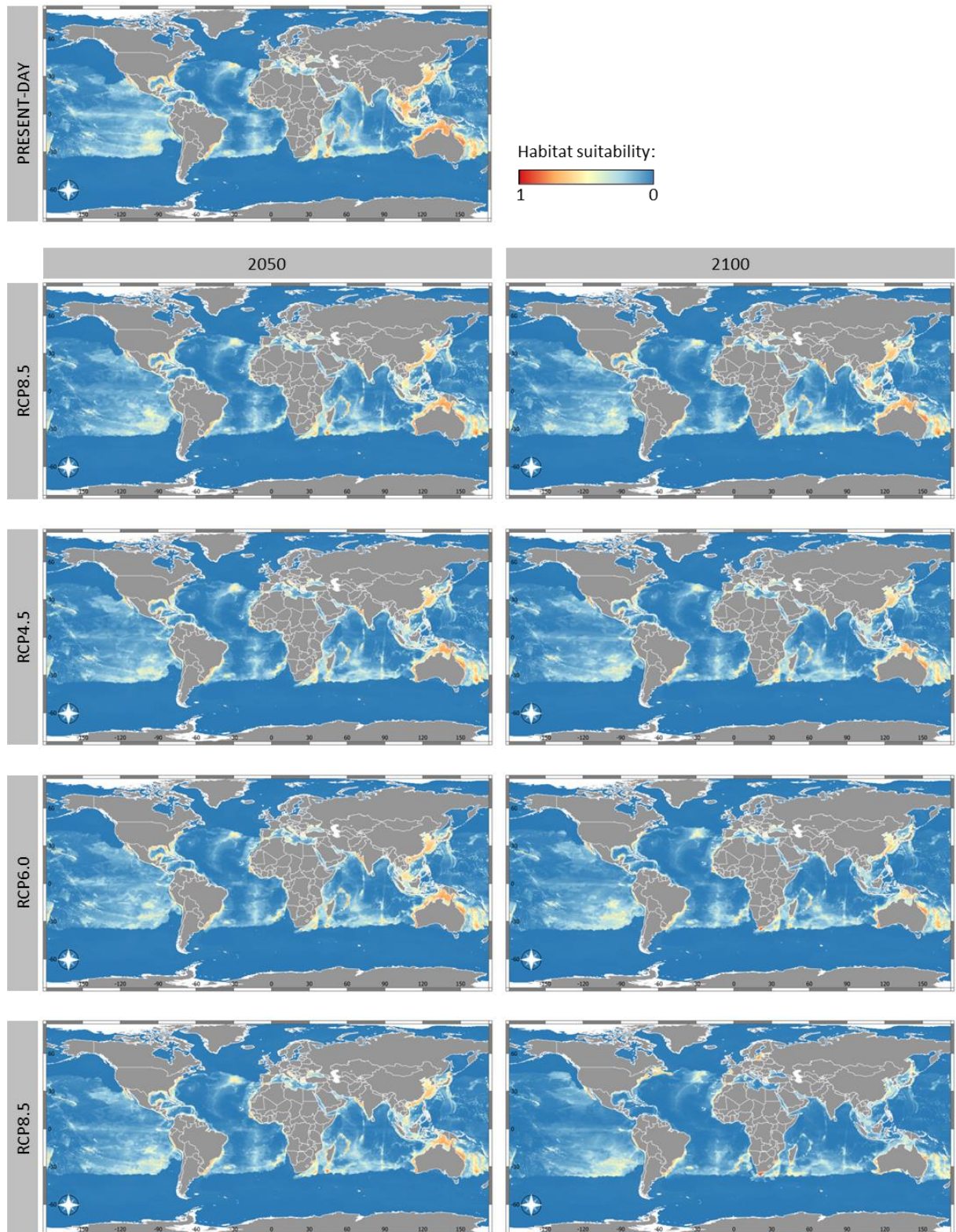
^A *Sphyrna lewini* (Griffith & Smith, 1834) in GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset <https://doi.org/10.15468/39omei> accessed via GBIF.org on 2023-03-20.

^B *Sphyrna zygaena* (Linnaeus, 1758) in GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset <https://doi.org/10.15468/39omei> accessed via GBIF.org on 2023-03-20.

^A *Sphyrna mokarran* (Rüppell, 1837) in GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset <https://doi.org/10.15468/39omei> accessed via GBIF.org on 2023-03-20. (See curated dataset and dataset keys for original databases in **Supplementary Data 1**)

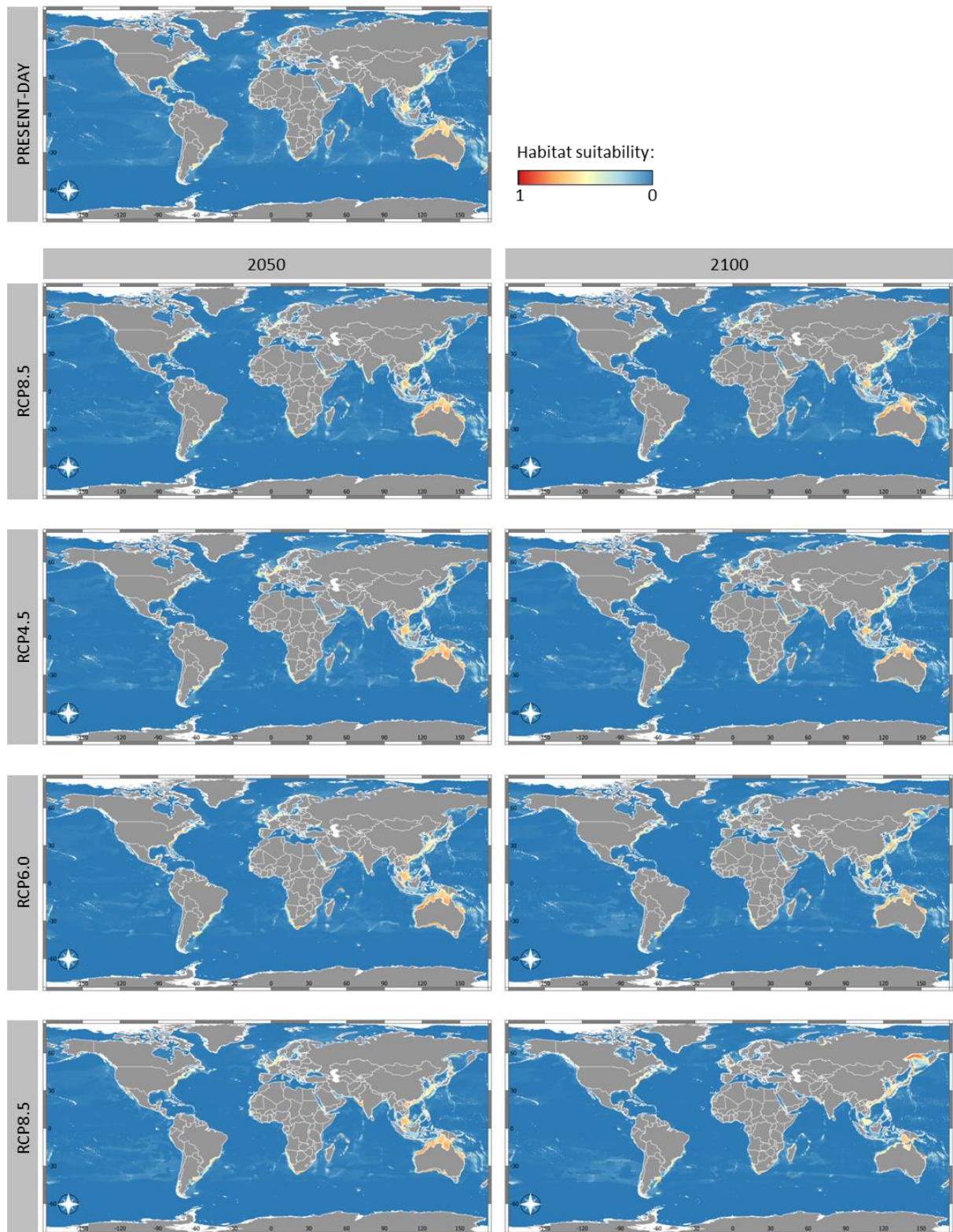
Supplementary Table 3 | Contribution percentage for the different predictor variables used in the ensemble models.

Variable	<i>S. lewini</i>	<i>S. zygaena</i>	<i>S. mokarran</i>
Maximum depth of the seafloor (m)	45.0%	62.2%	56.5%
Maximum sea surface temperature (°C)	39.0%	15.0%	16.7%
Range of sea surface temperature (°C)	6.8%	2.9%	7.2%
Range of surface current velocity (m/s)	4.5%	2.7%	1.3%
Range of sea surface salinity (PSS)	2.2%	10.6%	0.5%
Mean sea surface salinity (PSS)	2.1%	4.3%	11.6%
Minimum mass concentration of chlorophyll at the sea surface (mg/m ³)	1.6%	1.7%	0.3%
Range of mass concentration of chlorophyll at the sea surface (mg/m ³)	1.1%	0.1%	5.5%
Minimum current velocity at the sea surface (m/s)	0.7%	0.5%	0.3%



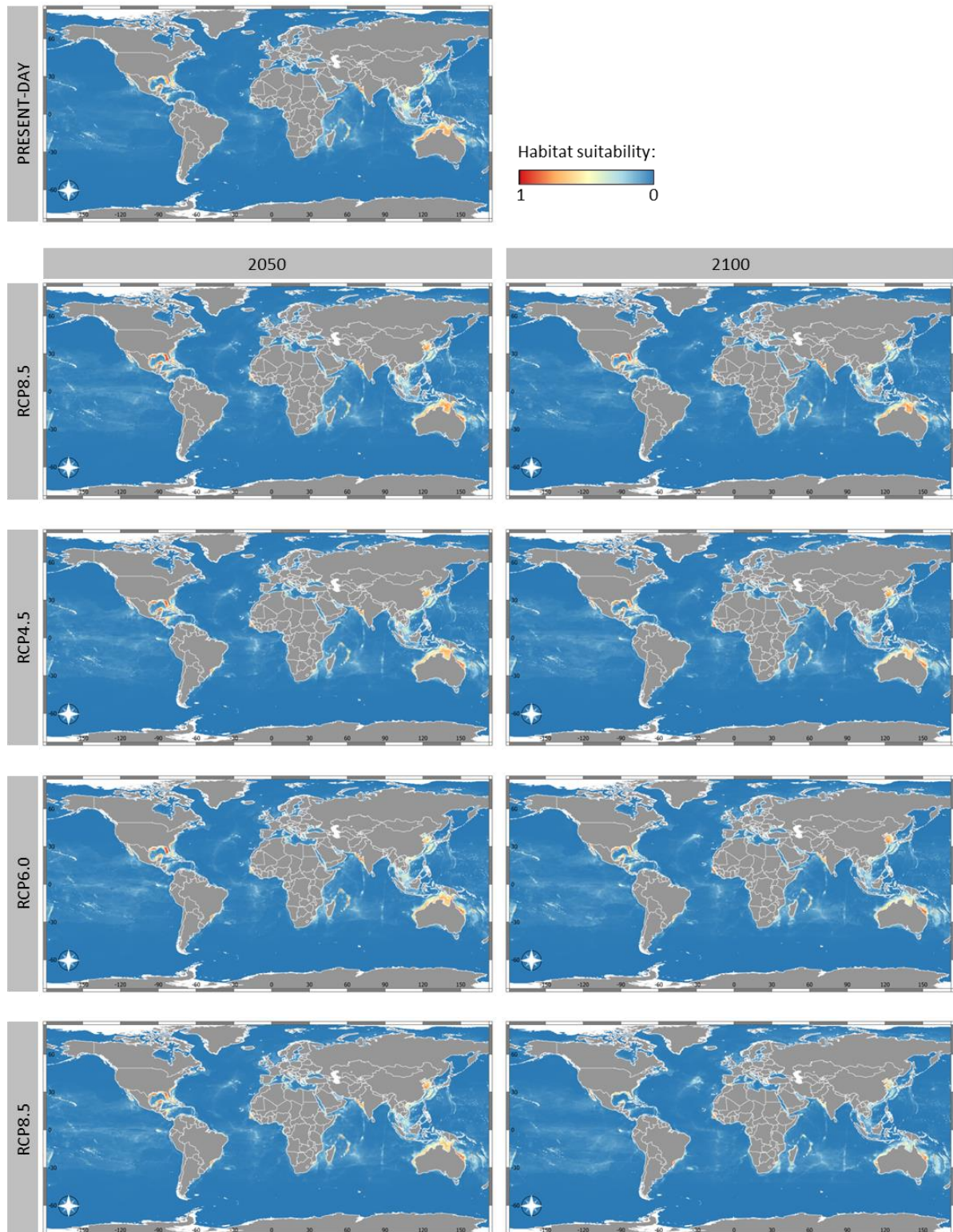
Supplementary Figure 1 | Regional patterns of habitat suitability for *Sphyrna lewini* predicted for the present-day projected for the middle (2050) and end (2100) of the century, considering different climate change scenarios (based on four Representative Concentration Pathways:

RCP2.6, RCP4.5, RCP6.0, RCP8.5). High resolution raster maps are available in **Supplementary folder 3**.



Supplementary Figure 2 | Regional patterns of habitat suitability for *Sphyrna zygaena* predicted for the present-day projected for the middle (2050) and end (2100) of the century,

considering different climate change scenarios (based on four Representative Concentration Pathways: RCP2.6, RCP4.5, RCP6.0, RCP8.5). High resolution raster maps are available in **Supplementary folder 3**.



Supplementary Figure 3 | Regional patterns of habitat suitability for *Sphyrna mokarran* predicted for the present-day projected for the middle (2050) and end (2100) of the century,

considering different climate change scenarios (based on four Representative Concentration Pathways: RCP2.6, RCP4.5, RCP6.0, RCP8.5). High resolution raster maps are available in **Supplementary folder 3**.