**Supplement:**

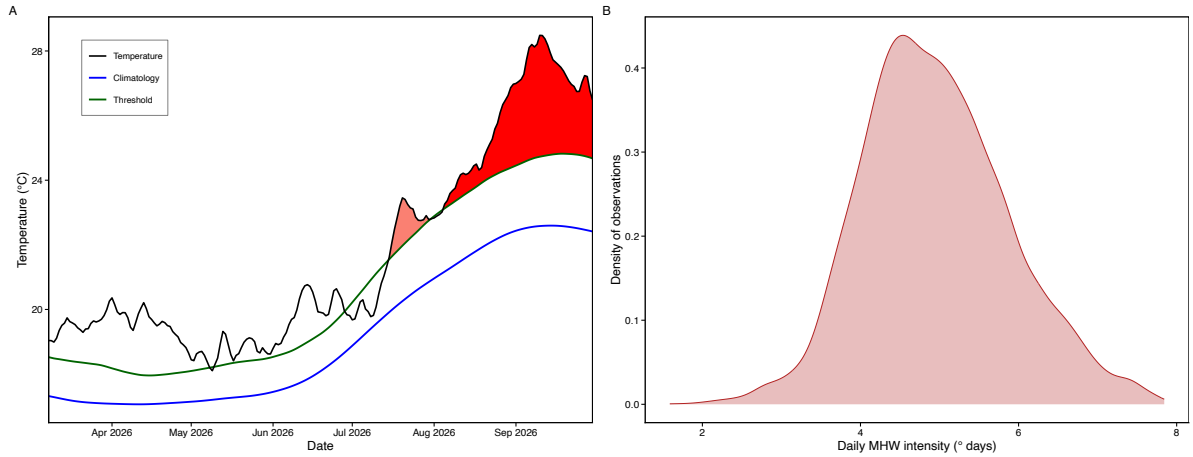



**Figure S1 | A numerical description of the marine heatwave (MHW) off the coast of Baja California, September 2026, based on OISST reanalysis data. a**, An event-line plot illustrating the most intense MWH detected within the time-series spanning 1 January 1982 to 30 September 2026 for the core of the MHW, as illustrated in Figure 1. **b**, The distribution of daily pixel-wise MHW intensities within the MHW core area across the month of September 2026.

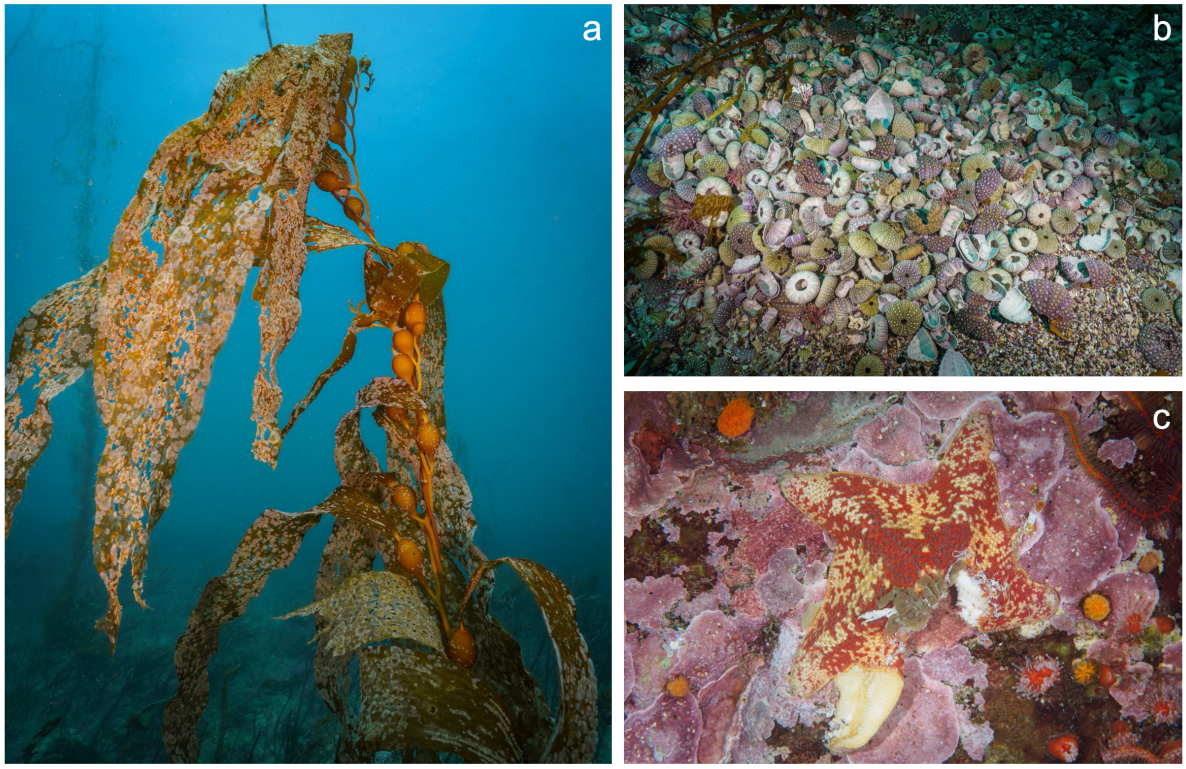



**Figure S2 | Images documenting the early impacts of the marine heatwave off the coast of Baja California, September 2026. a**, Degraded giant kelp (*Macrocystis pyrifera*). **b**, Mass mortality of purple sea urchins (*Strongylocentrotus purpuratus*). **c**, Disintegrating bat star (*Patiria miniata*). Photo credit: Anahi Bermudez.

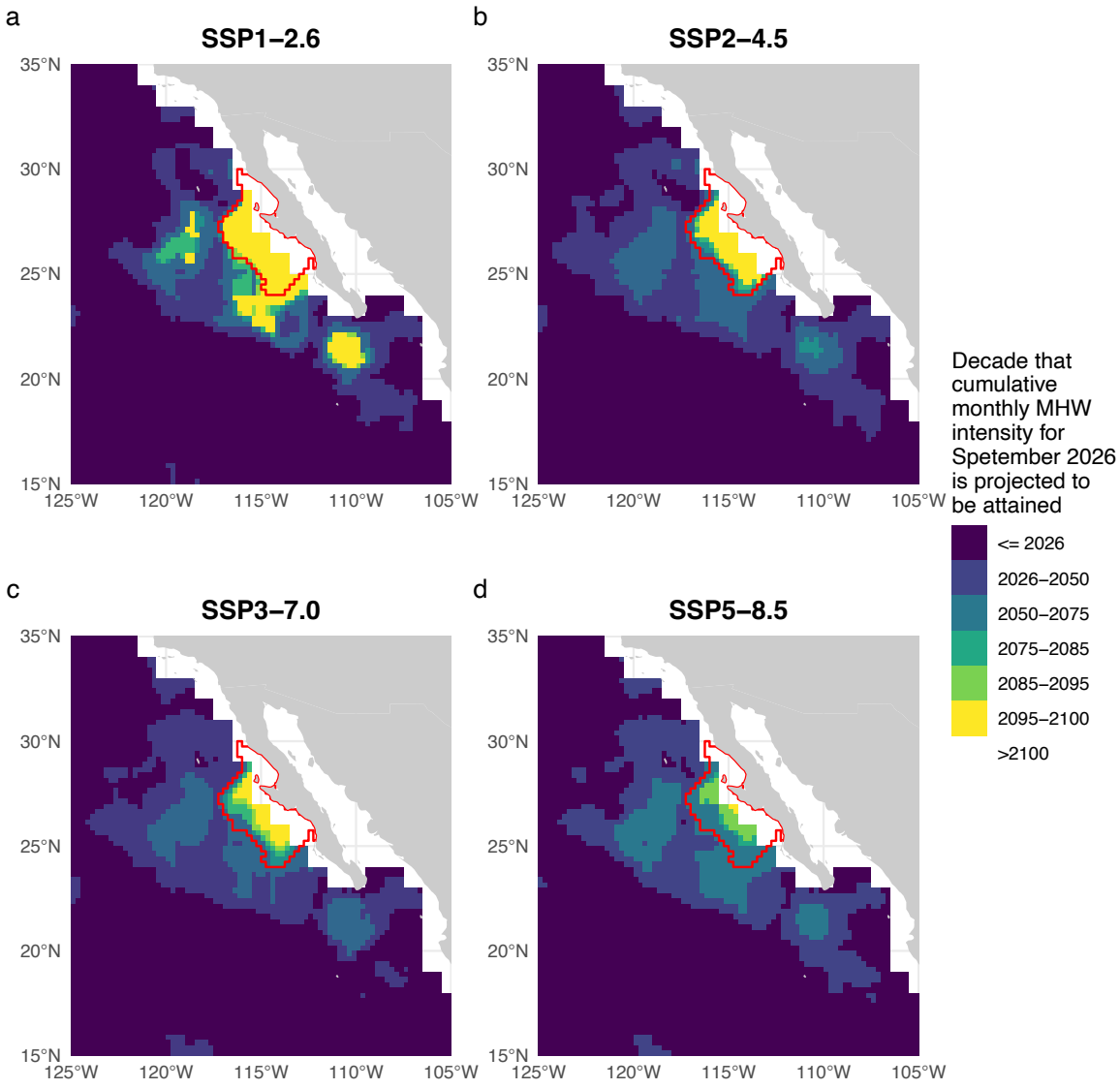



**Figure S3 | Sensitivity test of the median year across 12 ESMs in which the cumulative monthly marine heatwave intensity observed during the marine heatwave off the coast of Baja California, September 2026, was reached under four CMIP6 scenarios. a**, SSP1–2.6; **b**, SSP2–4.5; **c**, SSP3–7.0; and **d**, SSP5–8.5. These analyses were based on data regridded to 1°, without filling to the coast. The polygon outlined in red represents the core of the marine heatwave in September 2026, as in Fig. 1. Note that the scale in the legend is not linear.

**Table S1:** Details of the 12 Earth System Models (ESMs) used in our analysis, with information on their ocean components extracted from the netCDF files downloaded from the Earth System Grid Federation, and transient climate response from Hausfather et al.[1]

| **Earth System Model (ESM) name** | **Organisation developing the ESM** | **Ocean component modelling framework (horizontal resolution)** | **Transient climate response (likely range is 1.4–2.2°C)** |
|---|---|---|---|
| ACCESS-CM2 | ACCESS, CSIRO | GFDL-MOM5 (360 × 300) | 1.96°C |
| ACCESS-ESM1-5 | ACCESS, CSIRO | GFDL-MOM5 (360 × 300) | 1.97°C |
| CanESM5 | Canadian Centre for Climate Modelling and Analysis (CCCma) | NEMO3.4.1 (361 × 290) | 2.71°C |
| CESM2-WACCM | National Center for Atmospheric Research (NCAR) | POP2 (320 × 384) | 1.91°C |
| CMCC-ESM2 | Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC) | NEMO3.6 (ORCA1 362 × 292) | 1.92°C |
| GFDL-CM4 | NOAA Geophysical Fluid Dynamics Laboratory (GFDL) | GFDL-MOM6 (720 × 576) | 2.00°C |
| IPSL-CM6A-LR | Institute Pierre-Simon Laplace (IPSL) | NEMO3.6 (362 × 332) | 2.35°C |
| MIROC6 | JAMSTEC, AORI, NIES (Japan) | COCO4.9 (360 × 256) | 1.55°C |
| MPI-ESM1-2-HR | Max Planck Institute for Meteorology (MPI-M) | MPIOM1.6.3 (802 × 404) | 1.64°C |
| MRI-ESM2-0 | Meteorological Research Institute (MRI) | MRI.COM4.4 2 (360 × 364) | 1.67°C |
| NorESM2-LM | NorESM Climate Modeling Consortium (NCC) | MICOM (360 × 384) | 1.49°C |

| | | | |
|---|---|---|---|
| NorESM2-MM | NorESM Climate Modeling Consortium (NCC) | MICOM (360 × 384) | 1.22°C |

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**Table S2:** Details of Coupled Model Intercomparison Project Phase 6 (CMIP6) Scenarios used in our analysis, including warming by 2081–2100 relative to the pre-industrial (1850–1900), with 90% confidence intervals in parentheses, as well as a brief synopsis of their policy contexts. All estimates based on Schoeman et al.[2].

| Scenario | Warming by 2100, relative to the pre-industrial | A brief description of the policy context |
|---|---|---|
| SSP1–2.6 | 1.8°C (1.3°C–2.4°C) | Net zero emissions achieved in the latter part of this century. Consistent with the Paris Agreement. |
| SSP2–4.5 | 2.7°C (2.1°C–3.5°C) | Minor reductions in emissions by mid-century. Approximates 2030 NDCs. |
| SSP3–7.0 | 3.6°C (2.8°C–4.6°C) | Breakdown of coordinated climate policy under SSP3 (Regional Rivalry). Emissions approximately doubled by 2100. |
| SSP5–8.5 | 4.4°C (3.3°C–5.7°C) | Unlikely extreme counterfactual under which emissions double by mid-century, increasing thereafter. |

**Table S3:** Proportion of area within the core of the September 2026 marine heatwave in Baja California in each year-of-exceedance category illustrated in Figure 2.

| Scenario | Median projected year of exceedance across 12 CMIP6 Earth System Models | | | | | | |
|---|---|---|---|---|---|---|---|
| | Before 2026 | 2026–2050 | 2050–2075 | 2075–2085 | 2085–2095 | 2095–2100 | After 2100 |
| SSP1–2.6 | - | - | 0.022 | 0.004 | 0.026 | 0.047 | 0.901 |
| SSP2–4.5 | - | - | 0.082 | 0.116 | 0.082 | 0.078 | 0.642 |
| SSP3–7.0 | - | - | 0.172 | 0.121 | 0.138 | 0.116 | 0.453 |
| SSP5–8.5 | - | - | 0.466 | 0.147 | 0.254 | 0.056 | 0.078 |

**Table S4:** Proportion of area within the core of the September 2026 marine heatwave in Baja California in each year-of-exceedance category illustrated in Figure S1.

| Scenario | Median projected year of exceedance across 12 CMIP6 Earth System Models | | | | | | |
|---|---|---|---|---|---|---|---|
| | Before 2026 | 2026–2050 | 2050–2075 | 2075–2085 | 2085–2095 | 2095–2100 | After 2100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SSP1–2.6 | - | - | - | 0.008 | 0.016 | 0.055 | 0.921 |
| SSP2–4.5 | - | - | 0.134 | 0.173 | 0.071 | 0.094 | 0.528 |
| SSP3–7.0 | - | - | 0.181 | 0.22 | 0.142 | 0.118 | 0.339 |
| SSP5–8.5 | - | - | 0.575 | 0.142 | 0.268 | 0.016 | - |

**Literature cited:**

1. Hausfather, Z., Marvel, K., Schcmidt, G. A., Nielsen-Gammon, J. W. & Zelinka, M. Climate simulations: Recognize the 'hot model' problem. *Nature* **605**, 26–29 (2022).

2. Schoeman, D. S. *et al.* The policy relevance of climate-change scenarios for biodiversity research. *Nat. Rev. Biodivers.* 1–15 (2026) doi:10.1038/s44358-026-00193-7.