

Supplementary: Immediate Impact of the 2021 Harmful Algal Bloom in Southeast Hokkaido on the Rocky Intertidal Benthic Community and Its Spatial Variation

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The cell density of HAB species was derived by using the surface chlorophyll-*a* concentrations reported by Kuroda et al. (2022), who measured the chlorophyll-*a* concentration along a ship track (during 4–14 October 2021) in their study of the same HAB event. They presented chlorophyll-*a* concentration values in a census map as colored grid cells (Figure S1A in the present study, Figure 4 in Kuroda et al., 2022.). In addition, they provided a log-log regression equation of the *Karenia* spp. abundance versus chlorophyll-*a* concentration (Figure 7 in Kuroda et al., 2022):

$$\text{Karenia log abundance} = 2.032 \times \text{Chlorophyll-}a \text{ concentration} + 0.135$$

In the present study, we selected the colored grid cell perpendicular to the coastline of each shore as the chlorophyll-*a* concentration data and calculated the cell density of *Karenia* spp. by the above regression equation (Figure S1B). Specifically, we first calculated the distance between the RGB color space of a selected colored grid cell and the RGB color space of each colored grid cell in the legend (Figure S2). Then, the integer of the colored grid cell in the legend with the minimum distance from the selected colored grid cell was used as the chlorophyll-*a* concentration (Figure S1B). Finally, the log abundance of *Karenia* spp. was calculated by the above regression equation, and we conducted an exponential operation to calculate the cell density of *Karenia* spp.

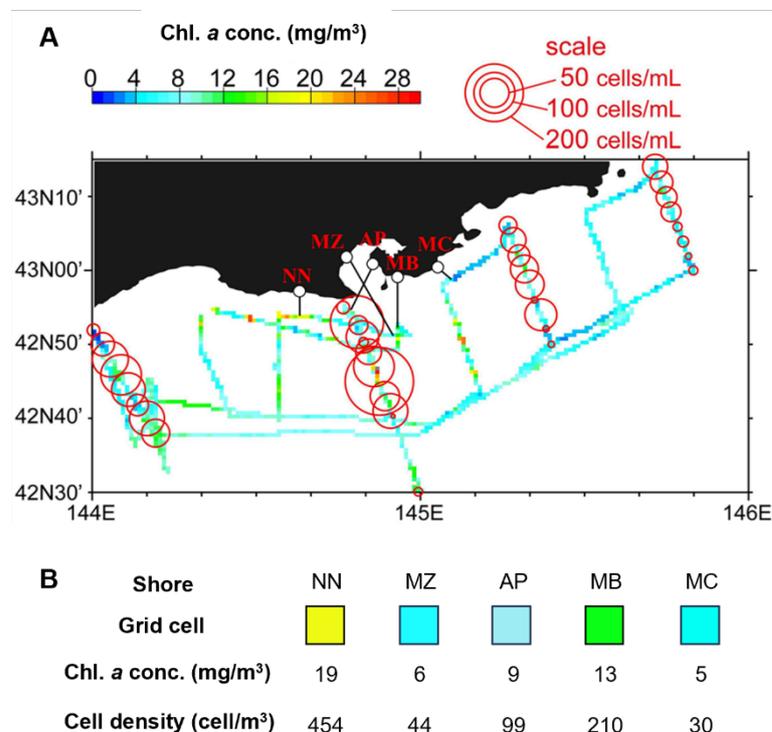


Figure S1. (A) Surface chlorophyll-*a* concentrations (colored grid cells) along the ship track during 4–14 October, 2021 conducted by Kuroda et al. Grid cells show averages across 45" (longitude) × 30" (latitude) (i.e., an approximately 1 × 1 km rectangle). *Karenia* spp. abundance at a depth of 10 m is also shown by the area of red circles. We added five black hollow circles in original figure to indicate the census shore in present study. And we added the black solid lines perpendicular to the shoreline

of census shores to represent the colored grid cells that used to calculate the cell density of *Karenia* spp. in present study. **(B)** The enlarged view of the color grid cells, and the chlorophyll-a concentration calculated by RGB color value.

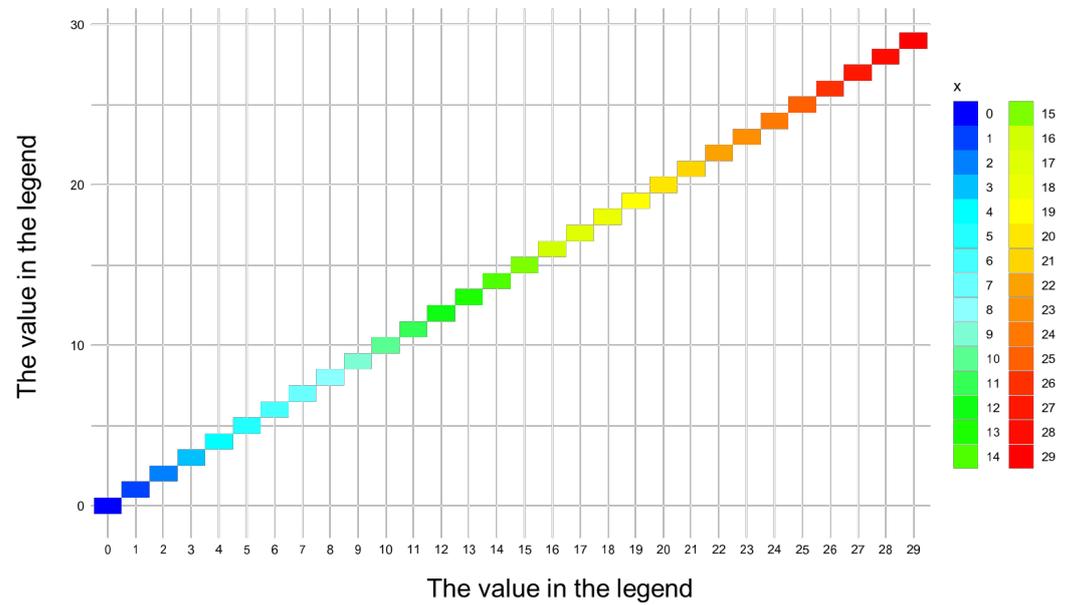


Figure S2. The reconstructed legend color space according to Figure 4 in Kuroda et al. (2022). The reconstructed approach was shown in the code execution below.

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