

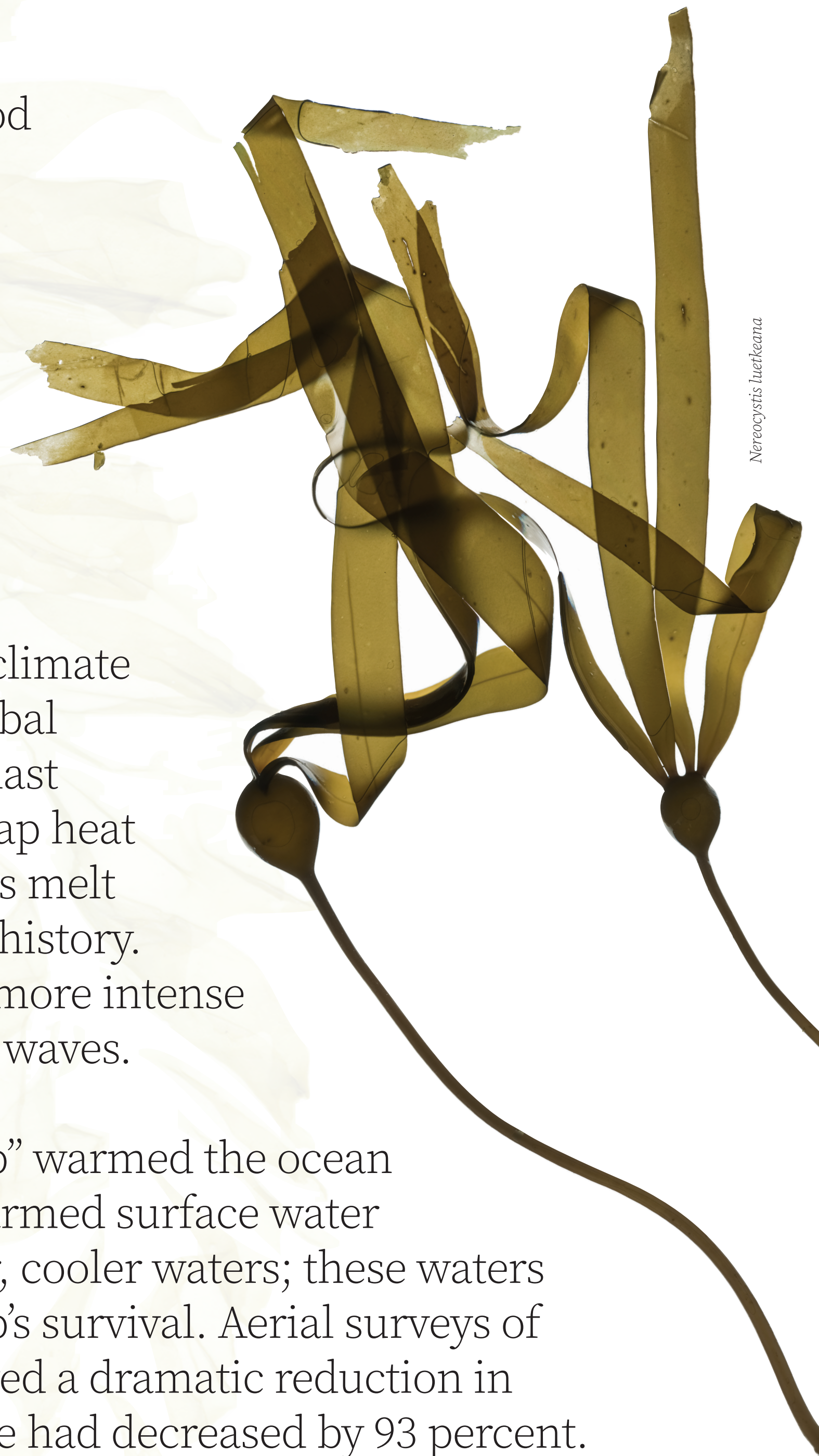
# *Climate Change and Marine Algae*

Seaweeds and kelps are astoundingly good at photosynthesis. Kelp forests produce approximately 20% of the oxygen in our atmosphere and are home to an enormous number of species. However, warming waters and changes in ocean chemistry threaten marine algae. These are symptoms of a larger crisis: climate change.

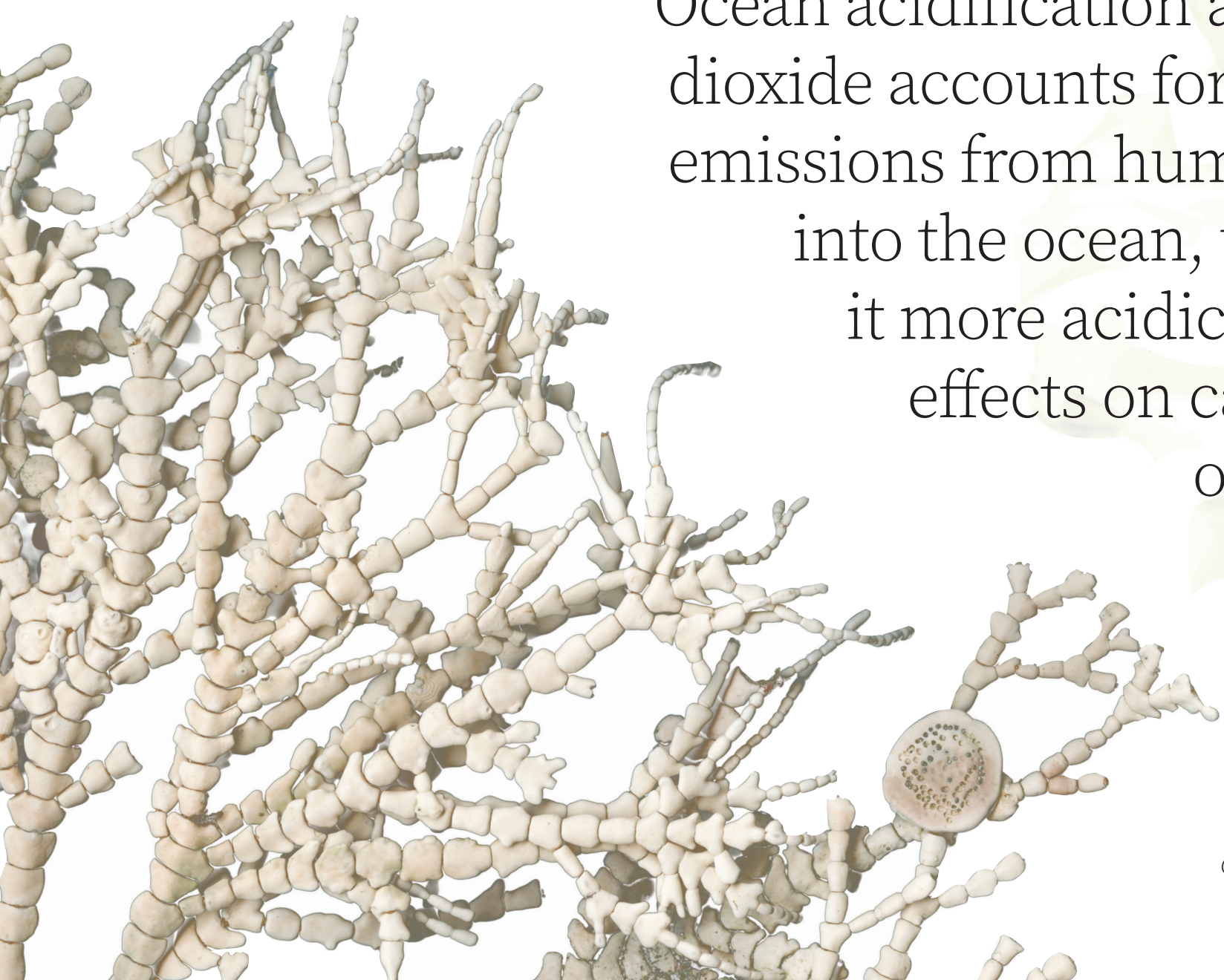
Climate change is the long-term shift in climate patterns, often referring to the rise in global temperatures (global warming) over the last several decades. As greenhouse gasses trap heat in the atmosphere, glaciers and ice sheets melt much faster than they have over human history. The rise in sea levels results in stronger, more intense hurricanes, and more droughts and heat waves.

A 2014 marine heatwave called “The Blob” warmed the ocean waters off of the California coast. The warmed surface water prevented *upwelling*, the rising of deeper, cooler waters; these waters are filled with nutrients vital for bull kelp’s survival. Aerial surveys of the Sonoma and Mendocino coasts showed a dramatic reduction in kelp coverage; at one point, kelp coverage had decreased by 93 percent. While The Blob gave way in 2017, the creeping rise in general ocean temperatures will provoke substantial changes in algal populations and increase an organism’s susceptibility to other stressors.

Ocean acidification also affects marine algae. Carbon dioxide accounts for 79% of all U.S. greenhouse gas emissions from human activities. As carbon is absorbed into the ocean, the water’s pH level decreases, making it more acidic. This acidification has disastrous effects on calcifying algae and shell-building organisms, as it prevents them from pulling free carbon ions from the water to build their hard shells.



*Nereocystis luerkeana*



*Corallina vancouveriensis*