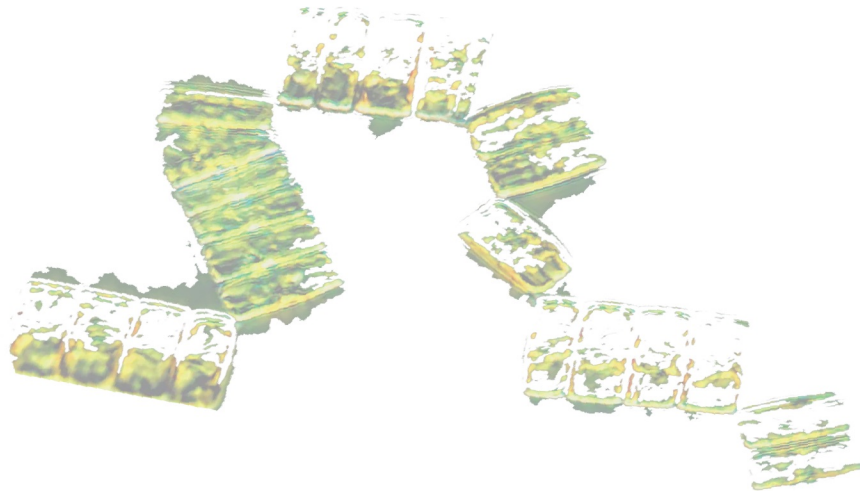
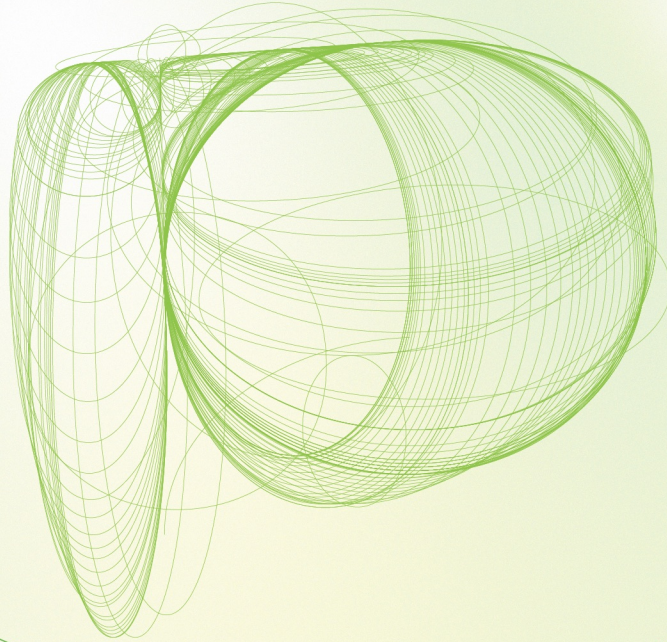


Living in Plankton Time Manual



A Temporal Manual for Reattuning Human Life to Planktonic Rhythms

2050 Edition

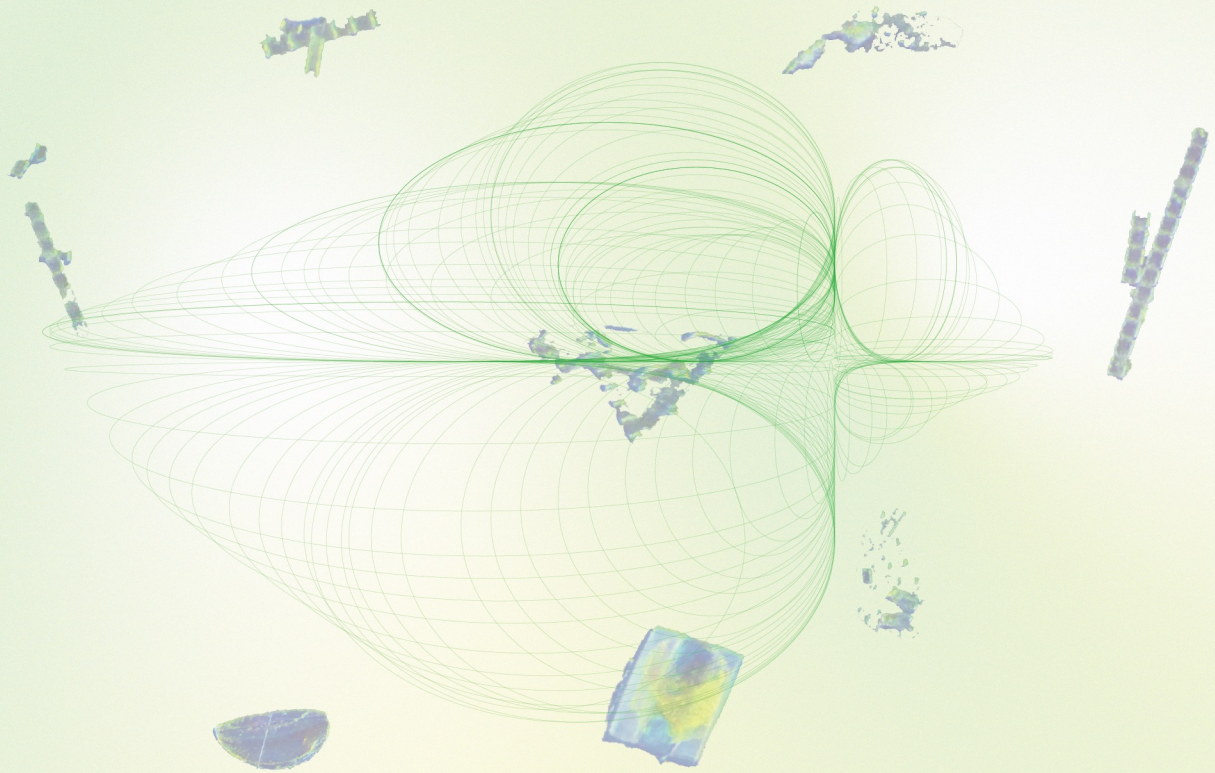


Table of Contents

0

1. What Is Plankton Time?
2. Diel Rhythms and Plankton
3. Tidal Rhythms and Ecological Resonance
4. Planktonic Time Units (Alternative Temporal Units)
5. A Planktonic Daily Cycle (Temporal Table + Human Actions)
6. The Planktonic Calendar (Ecological Month View)
7. The Planktonic Seasonal Wheel (Yearly Cycle)
8. How to Use the Planktonic Clock (2050 Field Application)
9. Co-living Protocol: Rhythmic Recommendations for Humans

0



1. What Is Plankton Time?

1

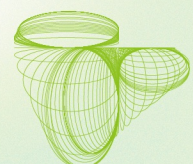
Plankton do not use clocks. Their lives unfold through light, tides, temperature, and nutrient flows, environmental pulses that compose a different kind of time: drifting, cyclic, and layered.

This manual envisions a future (2050) where humans co-exist with planktonic rhythms as part of ecological governance.

It is designed for industrial actors and policy-makers operating along the North Sea coast of Edinburgh, guiding them to restructure behavior and decision-making according to nonhuman temporalities.

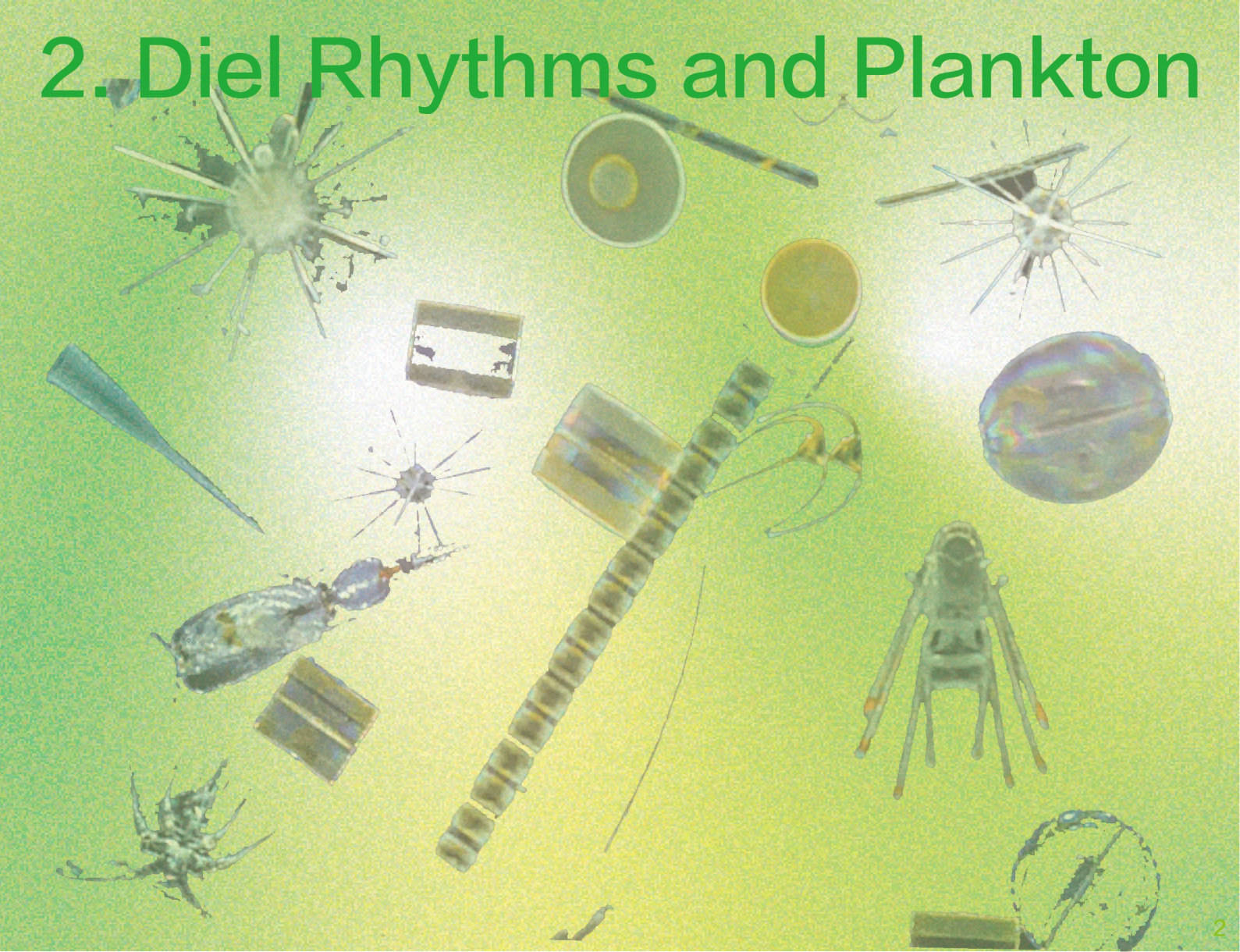
This is no longer a question of “What hour is it?” but rather:

“What are the plankton doing now and how should we respond?”



1

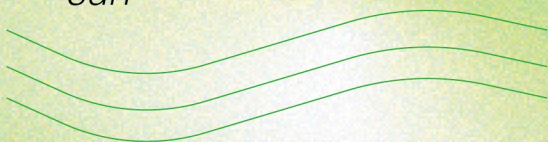
2. Diel Rhythms and Plankton



Plankton migrate vertically every 24 hours in response to light:

- At night: they ascend to feed (phototactic behavior)
- By day: they descend to avoid UV exposure and predators

sun

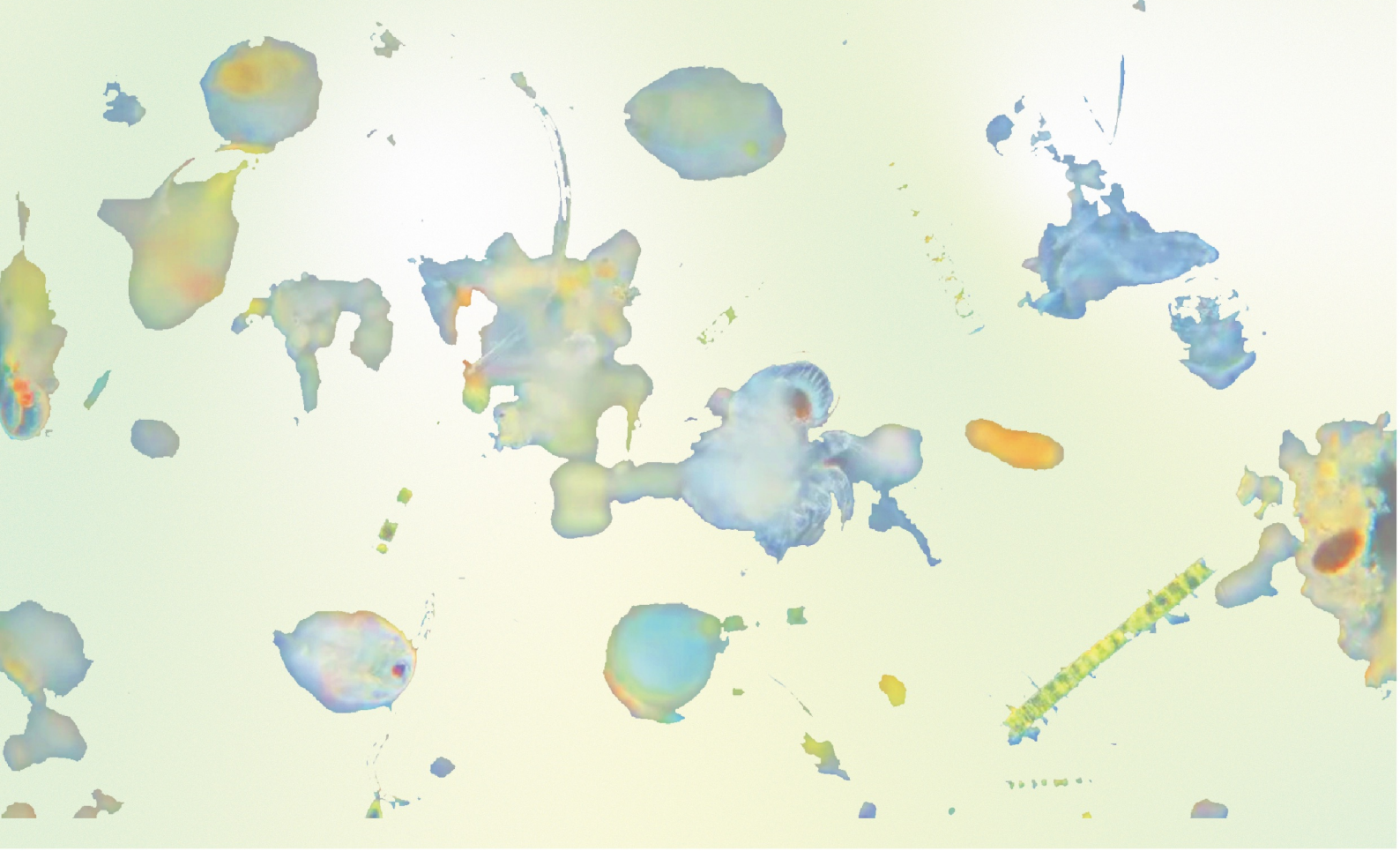


moon

This daily oscillation forms the core of “Planktonic Rhythm.”

- Emergence Period (Ascending): 18:00 – 6:00
- Quiet Segment (Descending): 6:00 – 18:00

3. Tidal Rhythms and Ecological Resonance



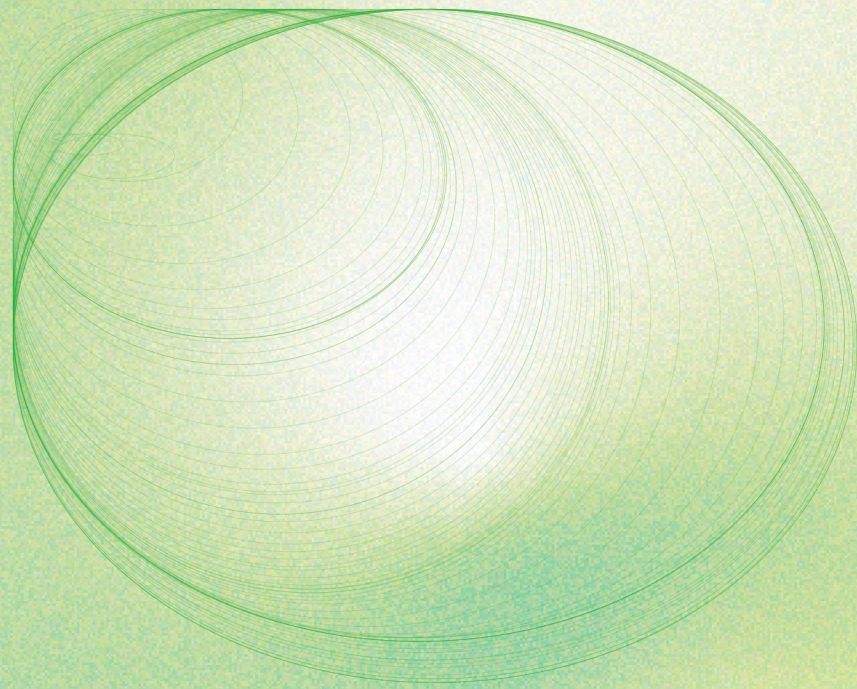
Tides cycle approximately every **12 hours and 25 minutes**. These pulses influence plankton concentration and behavior.

Tides are the planetary heartbeat. Plankton align with these movements—forming a layered rhythm of vertical migration and horizontal dispersion.

Usage Insight:

- Flood tide → Emergence begins
- Ebb tide → Quiet descent phase

In 2050, ecological districts use tide-synched rhythm markers to modulate maritime transport, emission windows, and light exposure zones.



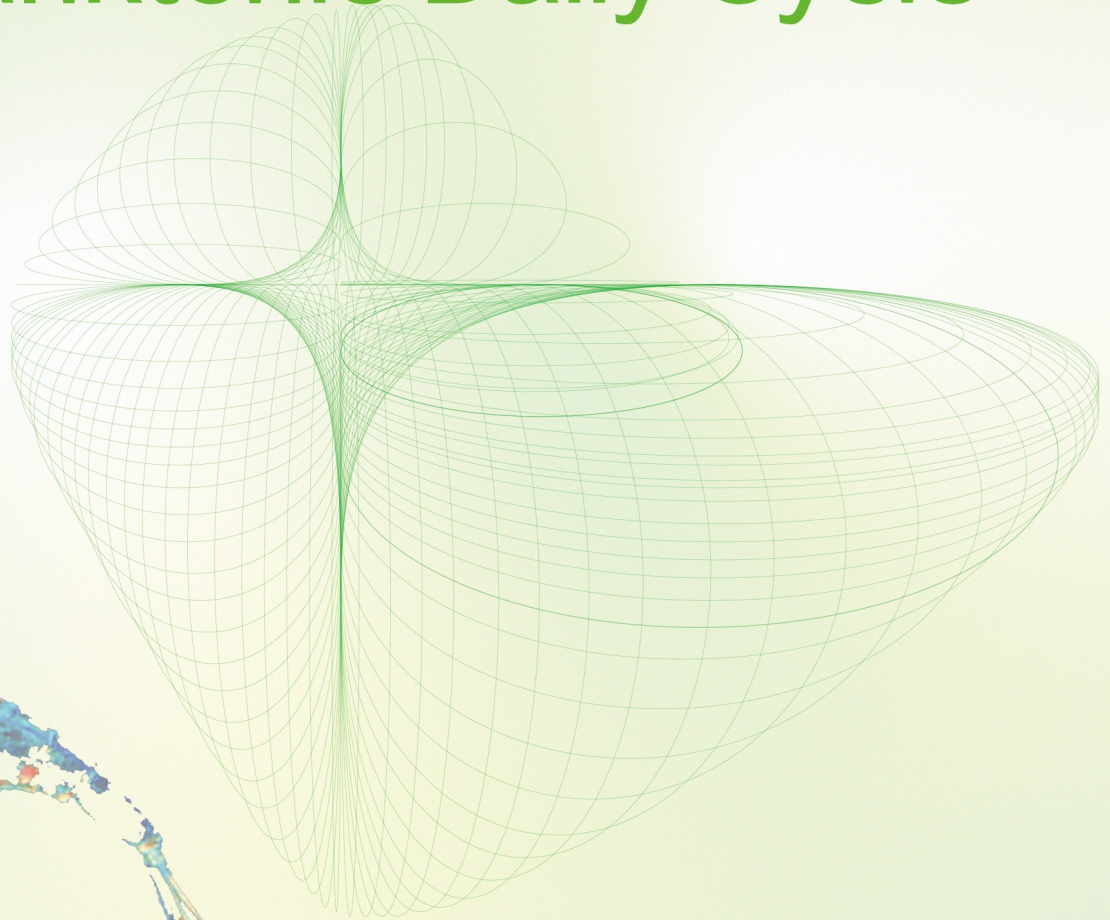
4. Planktonic Time Units

To perceive time through the lens of plankton, we propose new units:

- One Emergence Period $\approx$ 3 hrs of active migration (upward)
- One Quiet Segment $\approx$ 4 hrs of suspended drift or descent
- One Microcycle $\approx$ 6 hrs tidal phase rhythm

These units form the temporal scaffold for co-living agreements, replacing conventional minutes and hours with biological cadence.

5. A Planktonic Daily Cycle



Emergence _____ 18:00 – 6:00

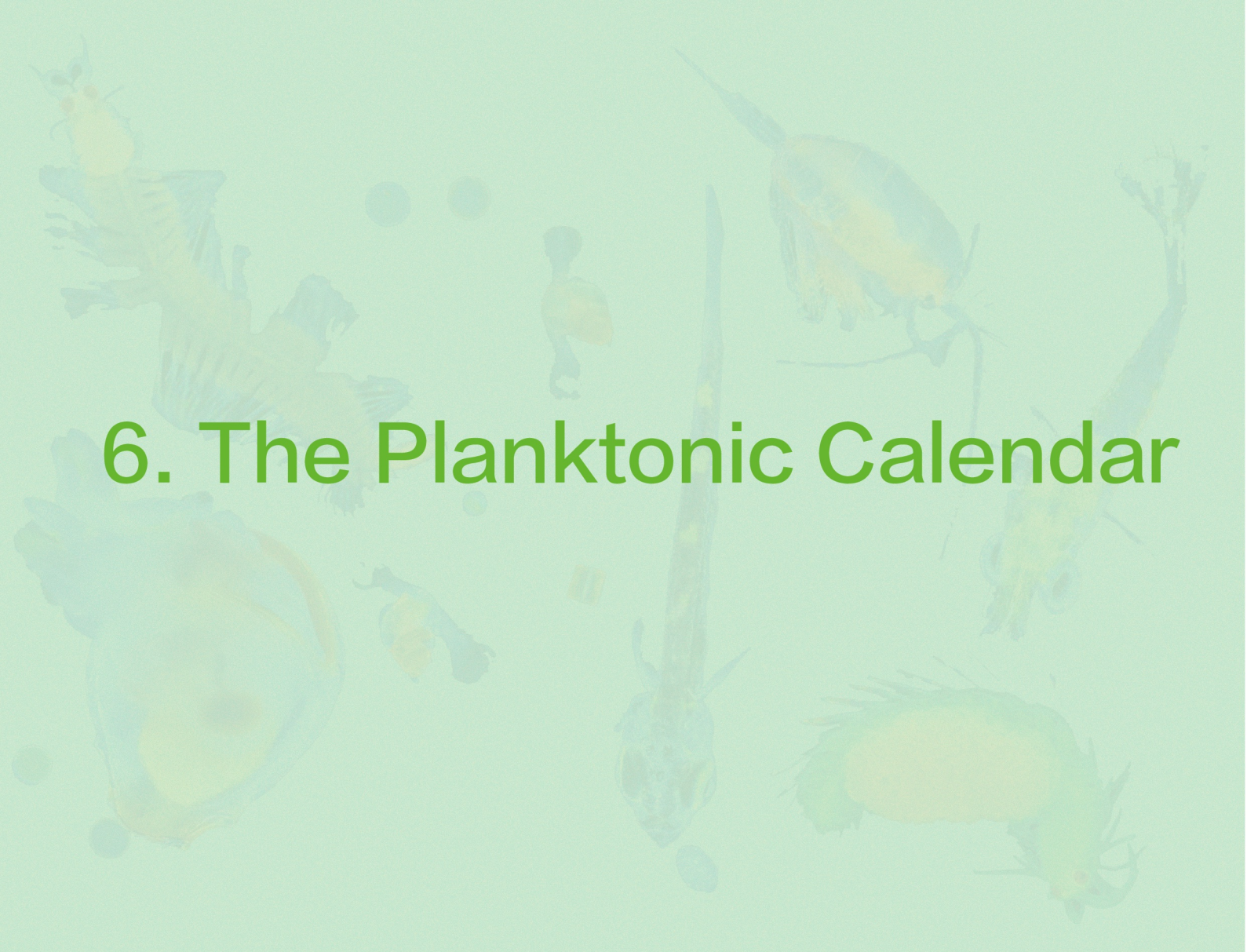
Dim artificial lights, pause dredging, allow surface feeding zones

Quiet Segment _____ 6:00 – 18:00

Conduct controlled work, reduce underwater sound, monitor sediment flow

Transitional Tide (midpoints)

Delay heavy transport, pause nutrient discharge



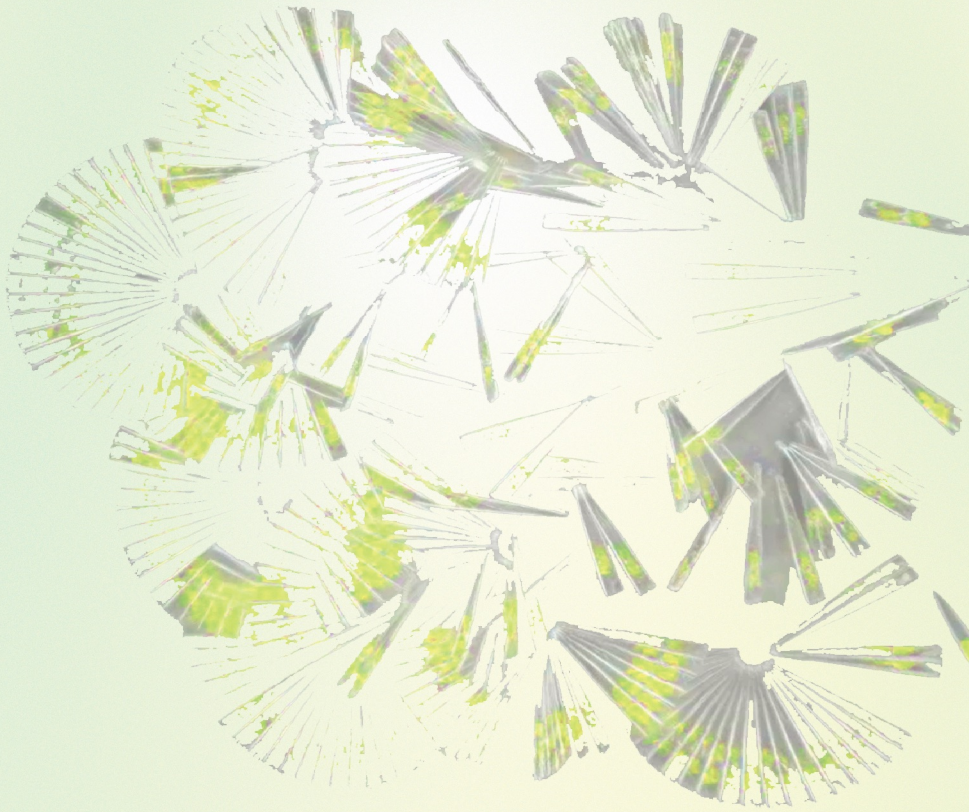
6. The Planktonic Calendar

Example: Spring

- Week 1: Initiation Phase (light increases, organisms awaken)
- Week 2: Density Rise (nutrient inflow, biological activity increases)
- Week 3: Bloom Phase (peak biomass, high metabolic rates)
- Week 4: Stabilization / Transition (energy plateau, redistribution begins)

In 2050, coastal districts use this calendar to coordinate harvesting bans, pollution controls, and resource pulses.

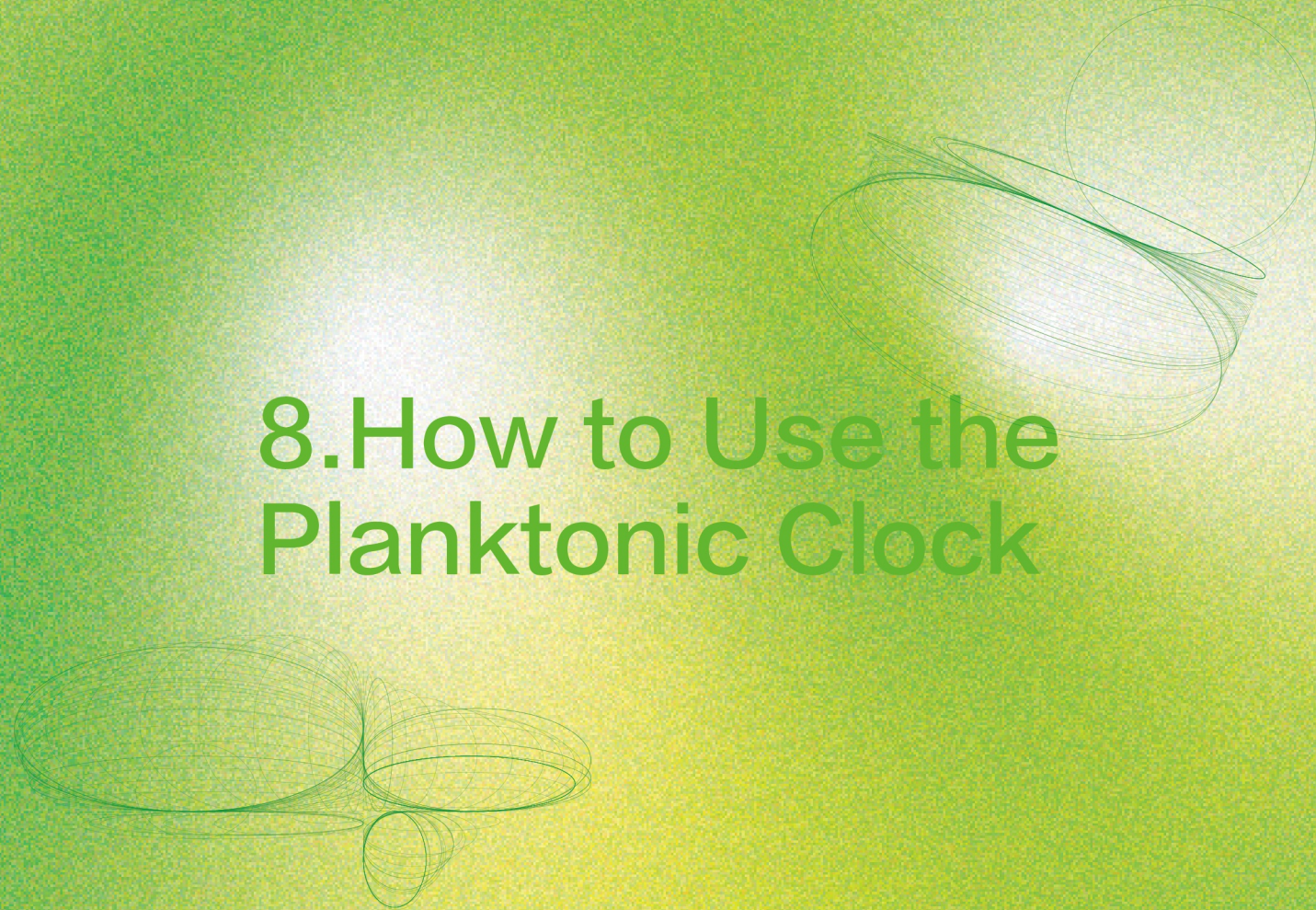
7.The Planktonic Seasonal Wheel



Planktonic time follows deep seasonal cycles:

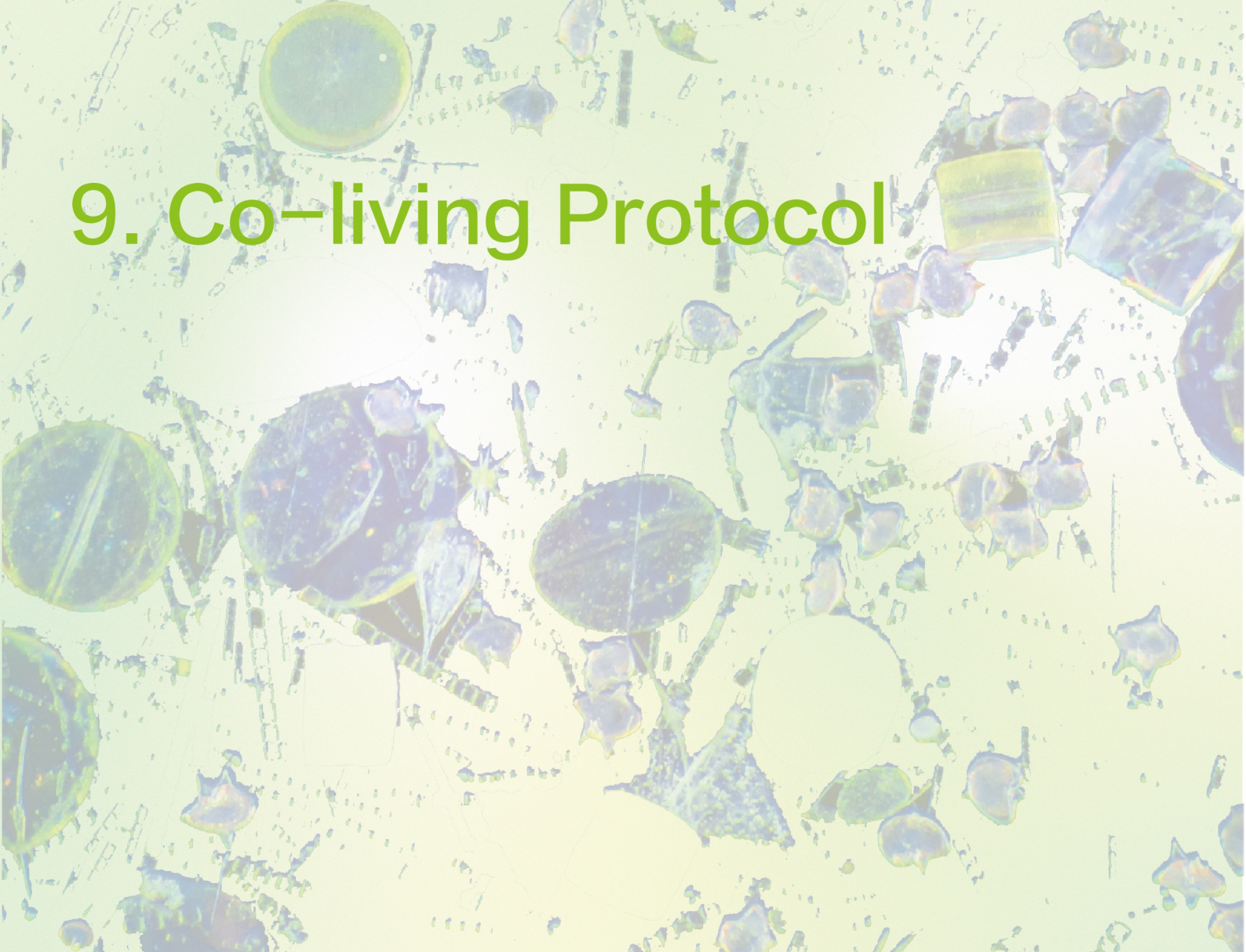
- Spring / Autumn: Bloom Surges (maximum density, ecological sensitivity)
- Summer: Vertical dispersal (deep layer migration)
- Winter: Dormancy (minimal motion, nutrient reset)

This seasonal wheel replaces holidays, fiscal quarters, and work cycles with ecological signals.



8. How to Use the Planktonic Clock

The Planktonic Time Clock is a modular time-keeping system shaped by plankton rhythms. Its three boards: Daily Cycle, Seasonal Bloom, and Thermal Response, materialize multispecies time. By streaming live tide and ocean data, the clock animates plankton activity patterns and invites humans to reorganize their routines around a non-linear, ecologically symbiotic tempo.



9. Co-living Protocol

Time State	Ecological Meaning	Human Response (Policy / Action)
Emergence Phrase	Surface concentration	Halt marine lighting, reduce emissions, protect bloom zones
Quiet Segment	Subsurface migration	Low-noise operation allowed, monitor bio-sedimentation
Dormant Window	Seasonal stillness	Conduct repair/maintenance only, pause extraction

Reference List



1. Su, Y., Hu, J., Xia, M., Chen, J., Meng, W., Qian, C., Shu, Y., Wang, C., Wang, X., Salehi-Ashtiani, K., Brynjólfsson, S., Lin, J., Li, Y., Zhang, H., Wang, L., and Fu, W. (2024) 'An undiscovered circadian clock to regulate phytoplankton photosynthesis' , Proceedings of the National Academy of Sciences, PMC, Available at: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11563040/>.
2. Oceans & Clouds (n.d.) Elixir Collection. Available at: <https://oceansclouds.com/en/product/elixir-collection> .
3. Matuszewski, D.J., Cesar Jr., R.M., Strickler, J.R., Baldasso, L.F., and Lopes, R.M. (2015) 'Visual rhythm for particle analysis in sample-in-flow systems: Application for continuous plankton monitoring' , Limnology and Oceanography: Methods, 13(9), pp. 470 - 482. doi:10.1002/lom3.10058.
4. Matuszewski, D.J., Lopes, R.M. and Cesar, R.M. (2013) 'Visual rhythm-based method for continuous plankton monitoring' , IEEE Proceedings. doi:10.1109/IEEEXplore.6683909. Available at: <https://ieeexplore.ieee.org/document/6683909>.
5. Dyomin, V., Polovtsev, I., Davydova, A. and Kirillov, N. (2025) 'Spectroscopic aspects of underwater digital holography of plankton' , Scientific Reports, 15, Article number: 1884. doi:10.1038/s41598-025-85790-w. Available at: <https://www.nature.com/articles/s41598-025-85790-w>.
6. NOAA (n.d.) Three studies document the puzzling vertical migration of marine organisms. Ocean Explorer. Available at: <https://oceanexplorer.noaa.gov/facts/vertical-migration.html>.
7. University of St Andrews (2021) Plankton sampling at North Stradbroke Island, Storytime, 26 March. Available at: <https://storytime.st-andrews.ac.uk/2021/03/26/plankton-sampling-at-north-stradbroke-island/>.
8. University of St Andrews (n.d.) BioTime: Full dataset download. Available at: <https://biotime.st-andrews.ac.uk/getFullDownload.php>.
9. The Guardian (2015) The beauty of plankton in pictures, 6 June. Available at: <https://www.theguardian.com/environment/gallery/2015/jun/06/the-beauty-of-plankton-in-pictures?page=with%3Aimg-6>.