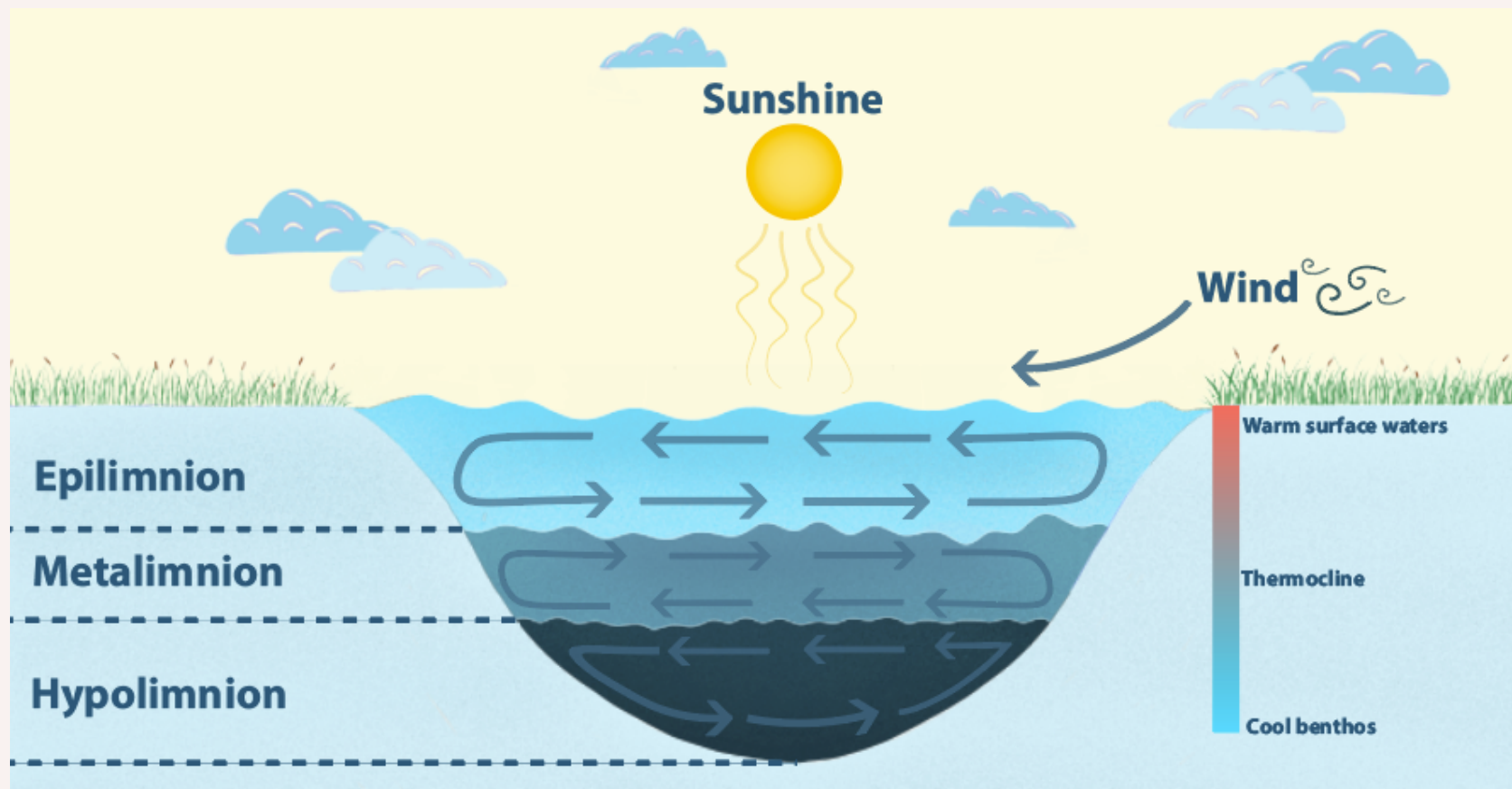


Lake Stratification:

*Lake stratification is the formation of distinct layers during warm weather. The greatest temperature difference between layers is known as the **thermocline**. Mixing of layers drives the over-turning of temperatures and nutrients and replenishment of nutrients and oxygen to the benthos.*



Summer:

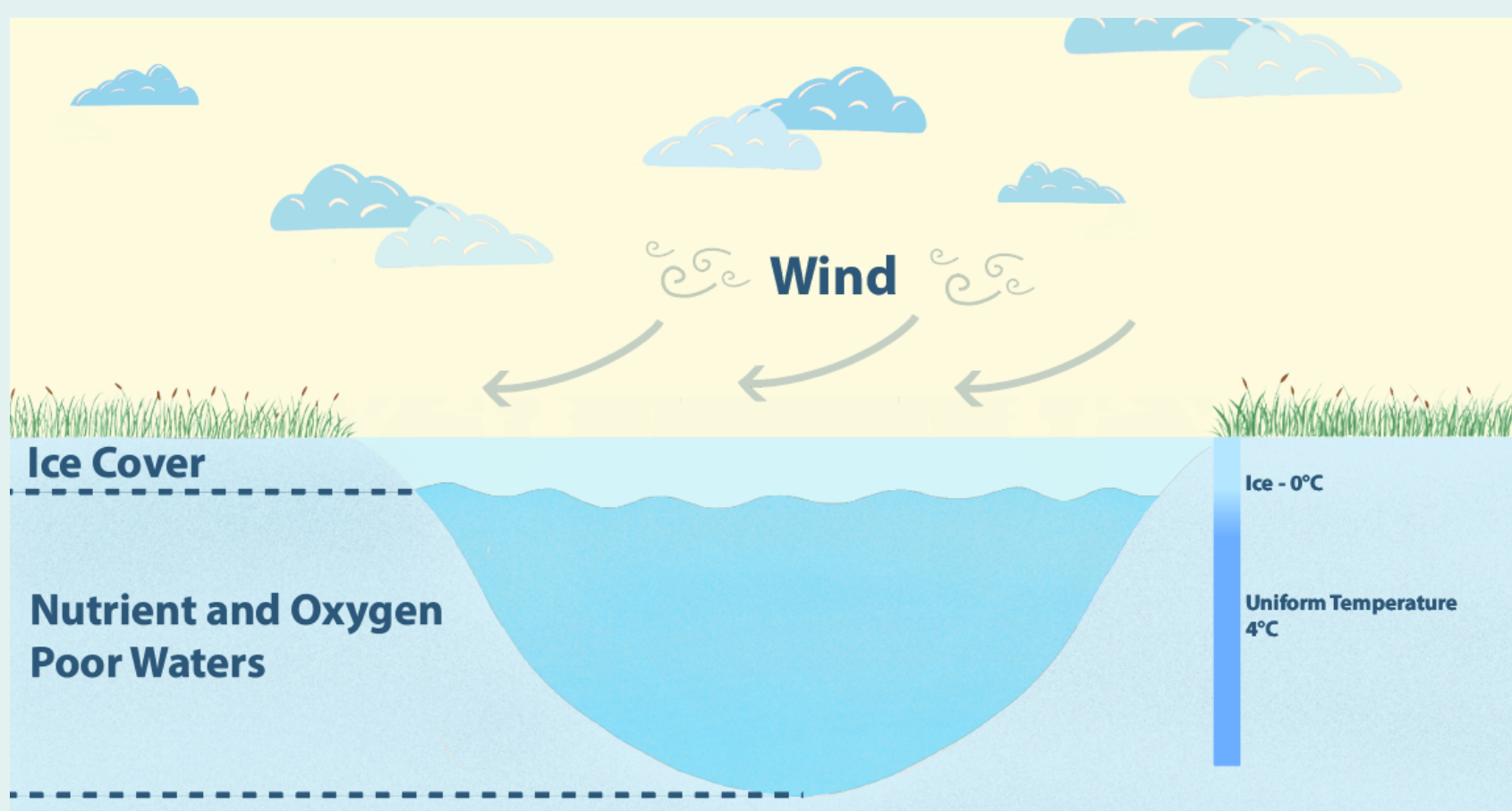
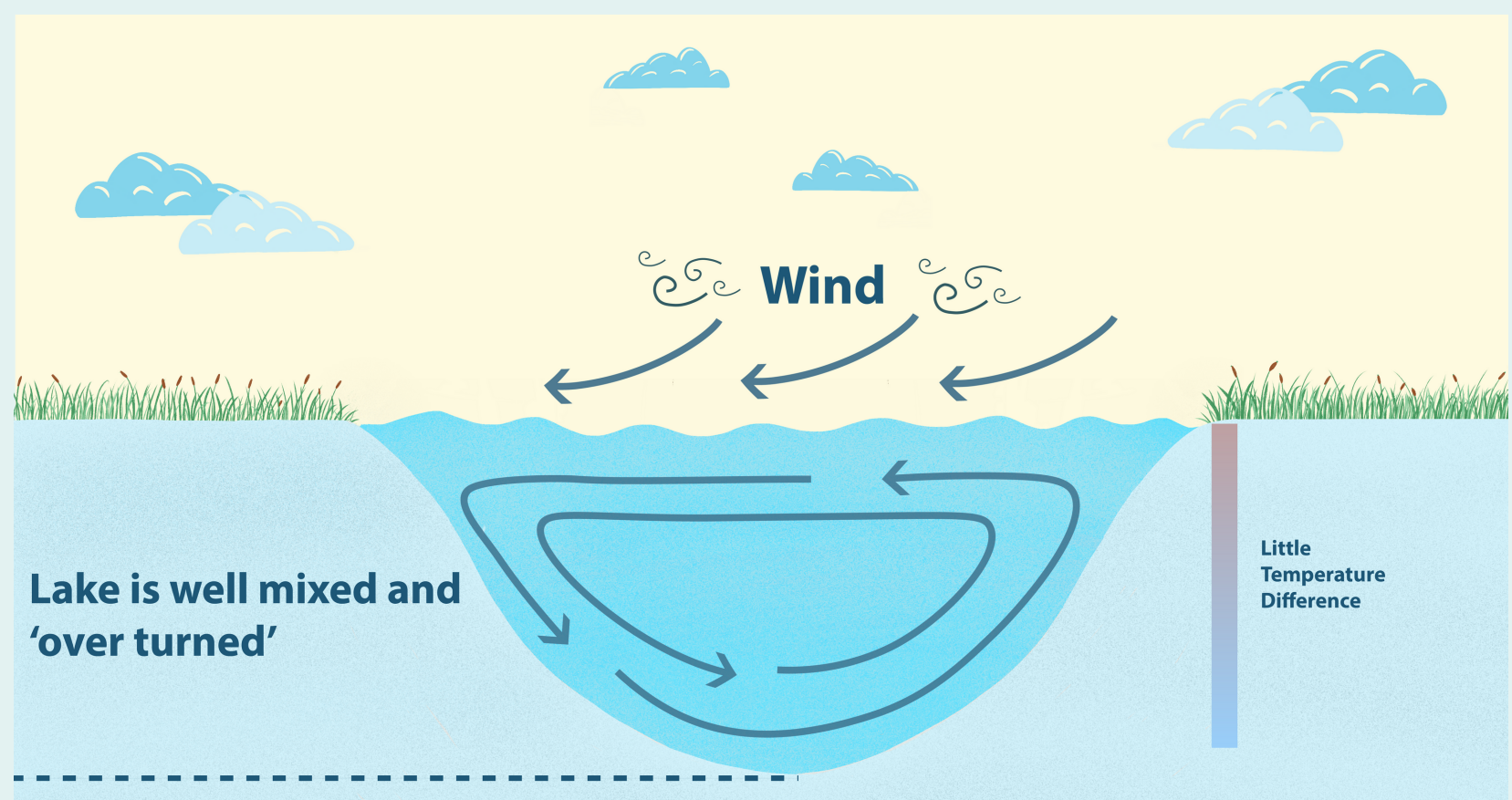
In summer, the lake forms three distinct layers, the epilimnion, metalimnion and hypolimnion.

- Warmer water is less dense and rises to form a warm epilimnion layer
- Solar radiation from the sun further warms this layer, driving more stratification
- Wind drives circulation and oxygenation in the upper layer
- The deepest layer is cold and contains the least amount of oxygen, inhibiting the growth of fish and invertebrates.

Spring/Autumn:

Lake turn-over occurs in Spring and Autumn when the entire lake is 'mixed' by wind action.

- Wind moves the surface water increasing lake circulation and mixing of layers
- No layering or stratification is present
- Lake turnover generally occurs twice a year (Spring and Autumn)
- Important phase in lake hydrodynamics as it replenishes nutrients and oxygen to the benthos



Winter:

In icy regions, lakes freeze over in the winter completely reducing water circulation and turn over

- Anoxic (no-oxygen) and hypoxic (low-oxygen) waters develop
- As decomposition takes place in the benthos, oxygen is used up
- There are die-offs of plants and animals as oxygen, nutrients and light is limited.
- Cold and hypoxia resilient plants and animals survive the winters and dominate the lake



AOTEAROA LAKES
Lake Stratification

For more information see:
<https://cf.iisd.net/ela/blog/commentary/lakes-stratify-turn-explain-science-behind-phenomena/>
<https://www.rmbel.info/primer/stratification-and-mixing/>