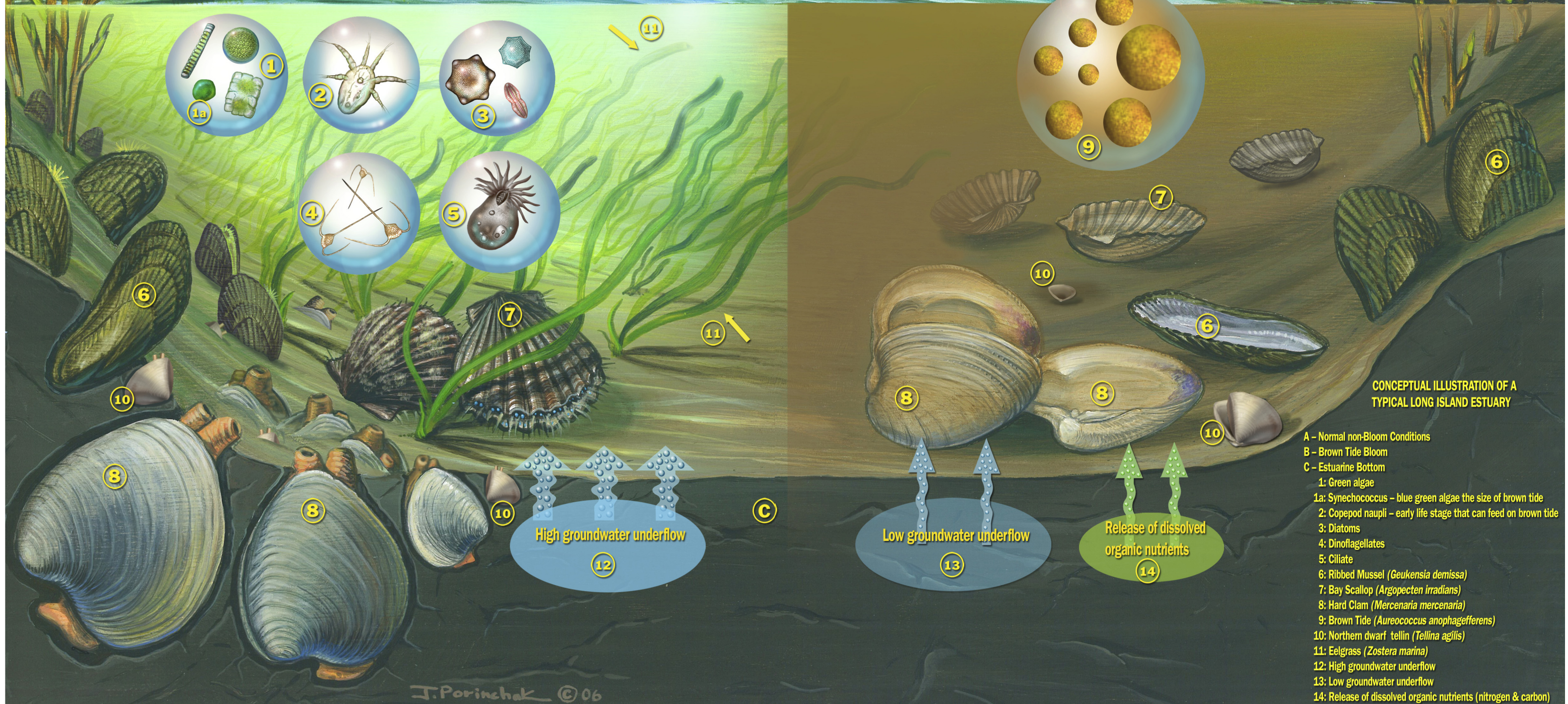


Typical Long Island Estuary

A Normal non-Bloom Conditions

B Brown Tide Bloom



A TYPICAL LONG ISLAND BAY ESTUARY WITHOUT A BROWN TIDE AND DURING A BROWN TIDE.

(OVERLEAF, PAGES 6-7)

ILLUSTRATION BY JAN PORINCHAK.

In estuarine environments, such as Great South Bay, Long Island, New York, multiple species of phytoplankton normally mix and coexist as a community forming the base of the food chain. Depending on the location and time of year, there can be tens or even hundreds of different phytoplankton species in an estuary at any given time. Phytoplankton populations fluctuate up or down, depending on environmental conditions such as light, nutrients, and grazing pressure from zooplankton and other filter feeders. When phytoplankton species reach a high abundance, they make up an algal bloom. Such multi-species blooms are normal and important in maintaining estuarine environments, removing carbon dioxide from the atmosphere, adding dissolved oxygen to the water, and they serve as a food source for fish stocks and other organisms in the estuary. Year after year, seasonal phytoplankton blooms help keep estuarine environments thriving.

Under normal light conditions, *A. anophagefferens*, like other algae, can use inorganic nutrients for growth and reproduction although at a lower rate compared to the co-occurring algae species. When sufficient inorganic nitrogen is present, other algae within the phytoplankton community out-compete *A. anophagefferens*, which remains a minor member of the phytoplankton community.

Late spring and early summer typically are associated with reductions in groundwater flow rates and decreased inputs of dissolved inorganic nitrogen. Springtime algal blooms sometimes use up available dissolved inorganic nitrogen. As a non-brown tide phytoplankton bloom ends, its organic matter is recycled. When light conditions are low or when inorganic nutrient supplies are depleted, *A. anophagefferens* has the ability to utilize organic compounds, such as dissolved organic nitrogen (e.g., urea) and carbon to grow. A combination of low light levels, mostly organic nutrients, low inorganic nutrients and reduced grazing pressure sets the stage for *Aureococcus anophagefferens* to bloom.