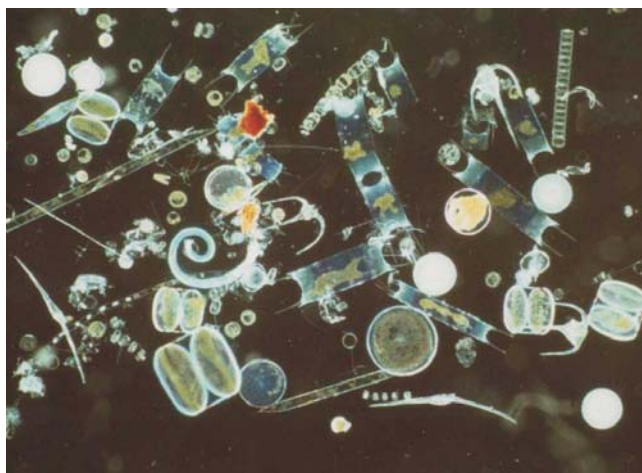


STRUCTURE & FUNCTIONING – CHARACTERIZATION AND IMPORTANCE FOR MANAGEMENT

HABITAT: Offshore pelagic (stratified) areas



Phytoplankton biomass is driven by light, nutrients and the seasonal occurrence of species. Image: Norman Nicoll / www.naturalvisions.co.uk



Ultimately, the food chain leads to top predators such as dolphins. Image: Judith Oakley.

Key: Very High 🏆🏆🏆🏆, High 🏆🏆🏆, Low 🏆🏆, Very Low 🏆 Not Relevant NR, Not possible to manage NP

	Importance to biological community	Likelihood of change	Management priority
PHYSICAL & CHEMICAL PROPERTIES & PROCESSES			
Wave action	🏆🏆🏆🏆	🏆	NP
Tidal flow strength	🏆🏆	🏆	NP
Immersion / emersion	NR	NR	NR
Salinity	🏆🏆	🏆	NP
Nutrients	🏆🏆🏆🏆	🏆🏆	NP
Supply of oxygen	🏆🏆🏆🏆	🏆🏆	🏆
Availability of suitable substrata	NR	NR	NP
Light	🏆🏆🏆🏆	🏆	NP
Contaminants	🏆🏆🏆	🏆🏆🏆	🏆🏆🏆
Sedimentation	🏆🏆	🏆	🏆
STRUCTURE			
Physical (stratification)	🏆🏆🏆🏆	🏆🏆	NP
Biological – plankton (composition including addition of non-natives)	🏆🏆🏆🏆	🏆🏆🏆🏆	🏆🏆🏆🏆
Biological – predators (composition including addition of non-natives)	🏆🏆🏆🏆	🏆🏆🏆🏆	🏆🏆🏆🏆

Citation: Hiscock, K. & Marshall, C. 2006. Dossier on Ecosystem Structure and Functioning – Characterization and Importance for Management: Offshore pelagic (stratified) areas. In: Hiscock, K., Marshall, C., Sewell, J. & Hawkins, S.J., 2006. The structure and functioning of marine ecosystems: an environmental protection and management perspective. Report to English Nature from the Marine Life Information Network (MarLIN). Plymouth: Marine Biological Association of the UK. [English Nature Research Reports, ENRR No. 699.]

	Importance to biological community	Likelihood of change	Management priority
FUNCTIONING (AS PROCESSES)			
Food supply remote (suspension feeding)	✓✓	✓✓	NP
Food capture - local (predators)	✓✓✓✓	✓✓✓✓	✓✓✓✓
Primary productivity	✓✓✓✓	✓✓✓✓	NP
Connectivity (larval dispersal & recruitment)	✓✓✓✓	✓	✓

- Turbulence determines the depth to which water is ‘agitated’ and a thermocline is therefore unlikely to form. The wave base is likely to be about 100 m in offshore areas. During calm weather, surface water heats-up and a discontinuity between warm and cold water develops.
- The strength of the thermocline, and therefore the degree of turbulence needed to break it, is important and will be determined in part by the amount to which shallow waters are heated.
- The layer thermocline is predominantly important in causing stratified waters and the stratification is a barrier to nutrients being transported from deeper waters to the surface.
- Tidal flow can contribute to the thermocline breaking-up.
- Salinity can be important to the development of a pycnocline which may be coincidental with the thermocline.
- Tropic mismatches may occur as preferred plankton food of fish larvae may become out of synchrony with each other – most likely as a result of warming seas.
- Predators (fish, sharks, cetaceans) are exploited directly or may be by-catch. Over-exploitation may result in a switch to jellyfish dominated communities and therefore less possibility of recovery.
- Pelagic offshore systems are open systems where human activities are unlikely to affect connectivity between areas.
- Non-native species may have a harmful effect on plankton and on larger predators especially where the non-native species poison (for instance dinoflagellate algae) or consume (for instance jellyfish consuming zooplankton including larval fish).

As stratification becomes increasing strong as a result of seawater warming (which is predominantly of shallow waters), there is a danger that nutrient transfer from deeper to shallower waters is blocked and shallow productivity declines.

Many potential changes are indicated as “Not possible” to influence. These changes are being driven by global climate change which requires global management actions.