

ECASA indicator

Name	Oxygen consumption fluxes
DPSIR class	Response
ECASA sub-group	Sediment
ECASA code	O2FLUX
Proposed by participant	
Definition, computation,	Methods for measuring oxygen flux include: 1. diver deployed benthic chambers on the sea bed (with microelectrodes or extraction of chamber water for determination of oxygen); 2. removal of sediment cores to laboratory and incubation of cores; 3. oxygen microprofiles using probes directly in sediment.
Data required	In situ measurements of oxygen near the sediment.
Summary, scientific meaning, implementation	<p>Marine sediments may become anoxic as a result of insufficient dissolved oxygen to maintain aerobic respiration of deposited material arising from the aquaculture operation. Availability of oxygen and associated biochemistry are major factors in determining the structure of the benthic faunal community and microbial populations.</p> <p>Nickell et al. (2003) showed sediment oxygen and nutrient fluxes (chambers) followed similar trends to benthic community abundance and biomass, declining with increasing distance from a salmon fish farm. Other studies correlate fish farm waste flux and sediment oxygen consumption (Holmer et al. 2002; Christensen et al. 2000; Findlay and Watling, 1997) and others investigate the effect of benthic single and multi-species on sediment oxygen flux (Waldbusser et al. 2004). Comparative studies exist in the literature between different measurement methods, Grenz et al. (2003) reporting correlation varying widely between methods depending on sediment type.</p> <p>Carbon flux from natural material in the water column measured via sedimentation fluxes in traps and sediment oxygen consumption (measured via incubation experiments) shown to vary seasonally (Grant et al. 2002). Examples of human activities other than aquaculture such as trawling on sediment oxygen consumption exist (Warnken et al., 2003).</p>
Range of validity	Information exists in the literature on the tolerance of certain species in sediments to oxygen depletion.
Species concerned (fishes/molluscs)	All
Related type of aquaculture	All
Relevant environments for this indicator	All
Geographic scale	local
Direct relevance to objectives	B
Clarity in design.	B
Realistic collection or development costs	C
High quality and reliability	B

ECASA indicator

Appropriate spatial and
temporal scale
Obvious significance

B

advantages

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disadvantages

references

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State of validation
recommendations