

## ECASA indicator

<b>Name</b>	<b>Redox Eh</b>
<b>DPSIR classe</b>	Impact
<b>ECASA subgroups</b>	Sediment
<b>ECASA code</b>	REDOXEh
<b>Proposed by participant</b>	Venice University
<b>Definition, computation, Data required</b>	Values of $E_H$ [mV] on the top 5 cm of sediment. Eh measurements
<b>Summary, scientific meaning, implementation</b>	The oxidation-reduction (redox) conditions in the surficial sediment depend on the degree of organic enrichment and can be assessed by measuring the vertical the redox potential profile in the top 15 cm (expressed in mV) (Zobell, 1946). The decrease in $E_H$ with the depth is related to the decrease in the concentration in dissolved oxygen concentration in the pore water. Negative redox-potentials are therefore associated with anoxic conditions, in which the degradation of the organic matter is carried out by anaerobic bacteria, which, in marine sediment, use mainly sulphate as electron acceptor and release hydrogen sulphide. (Porrello et al., in press; Chamberlain, 2002; Aleffi et al., submitted; Danovaro et al., 2004).
<b>Range of validity</b>	
<b>Species concerned (fishes/molluscs)</b>	All fishes
<b>Related type of aquaculture</b>	All molluscs 1) Mussel culture: - Longlines (Aleffi et al., submitted; Chamberlain, 2002; Danovaro et al., 2004) ; - Rafts (Chamberlain, 2002) ; 2) Fish cages (Porello et al., in press).
<b>Relevant environments for this indicator</b>	Coastal waters (Danovaro et al., 2004) ; Sheltered areas (Chamberlain, 2002); Coastal waters not protected by bays (Aleffi et al., submitted).
<b>Geographic scale</b>	Near vicinity of aquaculture operations
<b>Direct relevance to objectives</b>	A
<b>Clarity in design.</b>	A
<b>Realistic collection or development costs</b>	B
<b>High quality and reliability</b>	B
<b>Appropriate spatial and temporal scale</b>	B
<b>Obvious significance</b>	A
<b>advantages</b>	Refer directly to the input and degradation of organic matter from aquaculture (feces, pseudo feces, uneaten food)
<b>disadvantages</b>	Other sources of organic matter may interfere with the aquaculture source. Hydrodynamic regime has to be considered for data interpretation

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### references

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Danovaro, R., Gambi, C., Luna, G.M., Mirto, S., 2004. Sustainable impact of mussel farming in the Adriatic Sea (Mediterranean Sea): evidence from biochemical, microbial and meiofaunal indicators. *Marine Pollution Bulletin*, 49: 325-333.

Porrello, S., Tomassetti, P., Manzueto, L., Finoia, M.G., Persia, E., Mercatali, I., Stipa, P., in press. The influence of marine cages on the sediment chemistry in the Western Mediterranean Sea. *Aquac.*

Regnier, P., O'Kane, J.P., Steefel, C.I., Vanderborght, J.P., 2002. Modeling complex multi-component reactive-transport systems: towards a simulation environment based on the concept of a Knowledge Base. *Applied Mathematical Modelling*, 26: 913-927.

Zobell, C. E., 1946. Studies on redox potential of marine sediments. *Bulletin of the American Association of Petroleum Geologists* 30, 477-511.

### State of validation recommendations

Submitted to ECASA field tests

Parameter to be considered in sheltered environments