

ECASA indicator

Name	Total Nitrogen (sediment surface)																				
DPSIR class	Impact																				
ECASA sub-group	Sediment																				
ECASA code	TNSURF																				
Proposed by participant	14 - Venice University																				
Definition, computation,	A "relative" rank can be obtained by considering the ratio between the value of the measure at the impacted and reference site, as reported in tab 1. The calculation of this ratio, implies the application of a control or multi-control sampling strategy (Danovaro et al., 2004; Chamberlain, 2002; Porrello et al., in press).																				
Data required	Total Nitrogen concentrations are expressed as % of N in sediment. The concentration can be referred to the whole 6 to 10 cm core or to the surficial sediment (1 to 1.5 cm) (Chamberlain, 2002; Aleffi et al., submitted to ICES).																				
Summary, scientific meaning, implementation	The production of biodeposits (faeces and pseudofaeces) due to mussel cultivation, can cause an increase in the TN concentrations in the sediment underneath mussel lines (Chamberlain, 2002; Aleffi et al., in press). In a recent																				
Range of validity	<table border="1"> <thead> <tr> <th></th> <th>Mean surficial layer (1.5-2 cm)</th> <th>ratio to reference [imp.]/[ref.]</th> <th>References</th> </tr> </thead> <tbody> <tr> <td>TN reference Stat. [g/kg]</td> <td>2,21</td> <td></td> <td>Aleffi et al., submitted</td> </tr> <tr> <td>TN impacted Stat. [g/kg]</td> <td>2,96</td> <td>1,34</td> <td></td> </tr> <tr> <td>TN reference Stat. [%]</td> <td>0,3</td> <td></td> <td>Chamberlain, 2002</td> </tr> <tr> <td>TN impacted Stat. [%]</td> <td>0,55</td> <td>1,83</td> <td></td> </tr> </tbody> </table>		Mean surficial layer (1.5-2 cm)	ratio to reference [imp.]/[ref.]	References	TN reference Stat. [g/kg]	2,21		Aleffi et al., submitted	TN impacted Stat. [g/kg]	2,96	1,34		TN reference Stat. [%]	0,3		Chamberlain, 2002	TN impacted Stat. [%]	0,55	1,83	
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Species concerned (fishes/molluscs)	All																				
Related type of aquaculture	Fish culture Mussel culture: - Longlines (Aleffi et al., submitted; Martincic 1998; Chamberlain, 2002); - Rafts (Chamberlain, 2002). finfish culture: Marine cages (Porrello et al., in press).																				
Relevant environments for this indicator	Sheltered areas (Chamberlain, 2002). Coastal waters not protected by bays (Aleffi et al., submitted; Martincic, 1998).																				
Geographic scale	Local																				
Direct relevance to objectives	A																				
Clarity in design.	A																				
Realistic collection or development costs	C																				
High quality and reliability																					

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Appropriate spatial and temporal scale	B
Obvious significance	B
advantages	
disadvantages	
references	<p>Aleffi, I.F., Bettoso, N., Solis-Weiss, V., Tamberlich, F., Predonzani, S., Fonda-Umani, S., submitted to ICES – Journal of Marine Science. Effects of suspended mussel culture on the macrozoobenthos in the Gulf of Trieste (Northern Adriatic Sea, Italy).</p> <p>Chamberlain, J., 2002. Modelling the environmental Impacts of Suspended Mussel (<i>Mytilus edulis</i> L.) Farming. Ph-D Thesis, Napier Univeristy, Edimburgh.</p> <p>Christensen, P.B., Glud, R.N., Dalsgaard, T., Gillespie, P., 2003. Impacts of longline mussel farming on oxygen and nitrogen dynamics and biological communities of coastal sediments. <i>Aquac.</i> 218: 567-588.</p> <p>Cromey, C. J., Nickell, T. D., Black, K.D., 2002. DEPOMOD-Modelling deposition and biological effects of waste solids from marine cage farms. <i>Aquaculture</i> 214, 211-239.</p> <p>Dahlback, B., Gunnarson, L.A.H., 1981. Sedimentation and sulfate reduction under a mussel culture. <i>Mar. Biol.</i> 63, 269–275.</p> <p>Danovaro et al., 2004. Sustainable impact of mussel farming in the Adriatic Sea (Mediterranean Sea): evidence from biochemical, microbial and meiofaunal indicators. <i>Marine Pollution Bulletin</i> 49: 325-333.</p> <p>Kristensen, E., 2000. Organic matter diagenesis at the oxic/anoxic interface in coastal marine sediments, with emphasis on the role of burrowing animals. <i>Hydrobiologia</i> 426: 1-24.</p> <p>Martincic, B., 1998. Modello di Carrying capacity applicato alle mitilicoltura in sospensione. Ph-D Thesis in aquaculture, University of Florence, Pisa and Udine.</p> <p>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. <i>Aquac.</i></p> <p>Smaal, A.C., 1991. The ecology and cultivation of mussels: new advances, <i>Aquaculture</i> 94, 245-261.</p>
State of validation recommendations	