

ECASA - Model description template

NAME of model: <i>MOM (benthic model)</i>	Reporter/institute (a): <i>Carina P. Erlandsson, Address: University of Gothenburg, Box 450, 405 30 Gothenburg, Sweden Phone no: +46317862854 Email: caer@gvc.gu.se (b)Ander Stigebrandt Address: University of Gothenburg, Box 450, 405 30 Gothenburg, Sweden Phone no: +46317862851 Email: anst@gvc.gu.se</i>
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Short DESCRIPTION of model (b)

general description: *The task of the benthic model is to calculate the maximum sedimentation rate of organic matter that does not lead to extinction of the benthic fauna. The model estimate the current speed required to provide an oxygen flux to the sediment that would be sufficient to retain an infauna consisting of more tolerant species. Maximum oxygen transport to the bottom occurs when the difference between the oxygen concentration at the sediment surface and the water is at its maximum, i.e. when the oxygen concentration at the sediment is equal to a given minimum threshold value for the benthic fauna. The maximum oxygen difference and the minimum mean current speed determine the holding capacity, i.e. the maximum potential fish production at a farm, TPF_{bent} . The benthic model is one of four sub-models in the MOM model.*

main state variables (c): *oxygen concentration*

scale to which applicable (d): *Local (A)*

forcing data needed (e): *The maximum values of sedimentation of excess feed and faeces (calculated by the dispersion model), current velocities at the bottom (during minimum 2 weeks), oxygen concentration in surrounding bottom water, minimum accepted oxygen concentration at the sediment surface for infauna to prevail.*

possibly relevant INDICATORS (f)

driver:

pressure:

state: *oxygen concentration, biodiversity*

impact:

response:

STATUS of model (g)

origin(ator), present development state (has been tested, under development, etc)
present use, claimed robustness and scientific basis of this:

The benthic model was originally developed for Salmon (Stigebrandt and Aure, 1995), and is

described in Stigebrandt et al. (2004). This sub-model of MOM will not be further developed during the ECASA project, since it is not fish specie dependent.

IMPLEMENTATION OF MODEL

state of implementation (h):

state of documentation: *The benthic model was described in Stigebrandt et al. (2004) and in detail in Stigebrandt and Aure (1995).*

intellectual property concerns (i):

TESTING

summary of conditions and measurements needed - including critical forcing data (j)
criteria for model rejection

OTHER models

Used with this model (k): *The MOM model: fish model, water quality model, dispersion model, and benthic mode.l*

Similar models (l):

REFERENCES cited

Stigebrandt, A., Aure J., 1995. A model for critical loads beneath fish farms. Fisken och Havet No. 26, Institute of Marin Research, Norway, 1-27+appendix 1, 27 pp, by A. Stigebrandt (In Norwegian).

Stigebrandt, A., Aure, J., Ervik, A, Kupta Hansen, P., 2004. Regulating the environment impact of intensive marine fish farming III. A model for estimation of the holding capacity in the Modelling-Ongrowing-fish farm-Monitoring system. Aquaculture 234: 239-261.