H2020

TOOL FACTSHEET

Tool name
Assessment of Estuarine Trophic Status (ASSETS)

Tool type
Model for eutrophication assessment

Short description of the tool
The ASSETS is a highly aggregated integrative screening model that includes an assessment of pressure (Influencing Factors), state (Eutrophic Condition), and expected future response (Future Outlook) within a water body. The three components are then combined into a single overall score, called ASSETS. *Influencing Factors* rating is determined as a matrix based combination of nitrogen loading from the watershed and/or ocean and the capability of the system to dilute or flush the nutrient inputs. *Eutrophic Condition* rating is evaluated based on two groups of variables that reflect the direct and indirect water body response to nutrients. The extreme concentration or occurrence, frequency of occurrence, and spatial distribution are taken into account. Primary symptoms include (1) chlorophyll a and (2) macroalgae. Secondary symptoms include: (1) bottom water dissolved oxygen; (2) nuisance and toxic; and (3) submerged aquatic vegetation (SAV). The rating is determined by a matrix that combines the average score of primary and the highest score (worst impact) of the secondary symptom indicators using a precautionary approach. *Future Outlook* rating is determined as a matrix based combination of susceptibility (addressed above) and the prediction of future pressures (e.g., population pressure, agricultural pressure, and sewage treatment). The ASSETS rating combines the three components by matrix into a single rating of bad, poor, moderate, good, and high trophic status. (Bricker et al. 2003).

Source (where/ link)
http://www.eutro.org/register

Licence cost or other type of costs (e.g. maintenance)
The model is free

General requirements (technical and input data)
Input data are synthesiszed water quality data, for example 90th percentile of annual measures of chlorophyll a and 10th percentile of annual measures of dissolved oxygen, plus the spatial coverage of the highest (chlorophyll) and lowest (dissolved oxygen) measures, and the frequency of occurrence of the extreme (highest, lowest) measures. Some values are best expert knowledge (macroalgal abundance).

Management dimension for which the tool could be used

☒ Policy / Management

☒ Environmental

☐ Economic / Market

☐ Other sectors

Main functionality

☒ Site identification

☒ Modelling

☒ Mapping

☒ Stakeholder engagement

☐ Economic analysis

☐ Ecosystem services assessment

☒ Scenario analysis

☐ Other: (Please specify)

Fields of application (i.e. issue to be solved)

ASSETS can be used for determination of primary nutrient inputs that are causing degradation to water quality, the overall eutrophic condition of the waterbody and the probably change (worsen, improve) of condition in the future.

Circumstances in which it can be implemented (strength and opportunities)

ASSETS lets user to combine both empirical data and expert opinion. ASSETS can be used for scenario analysis.

Limitations

ASSETS cannot be used in data poor areas.

Technical skills needed to operate the tool

Basic computer skills are needed to access and fill in the data inputs.

Background knowledge needed to implement the tool

User needs to have enough data and knowledge of the system to evaluate the model results.

How can the tool contribute to the EAA

Please select the EAA steps that the tool can contribute:

1. ☐ Scoping
2. ☒ The identification of issues and opportunities
3. ☒ Prioritisation of issues
4. ☐ Objectives
5. ☒ Management actions
6. ☒ Monitoring

How can the tool contribute to the MSP

Please select the MSP steps that the tool can contribute:

1. ☒ Define goals and objectives
2. ☒ Gather data and define current conditions
3. ☒ Identify issues, constraints, and future conditions
4. ☒ Develop alternative management actions
5. ☒ Evaluate alternative management actions
6. ☒ Monitor and evaluate management actions
7. ☒ Refine goals, objectives and management actions

AquaSpace case studies in which it has been implemented

Case study name:

Long Island Sound and Great Bay Piscataqua, USA

Reference and link to case studies report:

AquaSpace D4.2 at Library/Reports page of www.aquaspace-h2020.eu

Other applications of ASSETS are described www.eutro.org

Other bibliographic references

1. Bricker, Suzanne B., Joao Gomes Ferreira, Changbo Zhu, Julie M Rose, Eve Galimany, Gary Wikfors, Camille Saurel, Robin Landeck Miller, James Wands, Philip Trowbridge, Raymond Grizzle, Katharine Wellman, Robert Rheault, Jacob Steinberg, Annie Jacob, Erik D. Davenport, Suzanne Ayvazian, Marnita Chintala, and Mark A. Tedesco. 2017. The role of shellfish aquaculture in reduction of eutrophication in an urban estuary. *Environ. Sci. Technol.*, Just Accepted Manuscript • DOI: 10.1021/acs.est.7b03970
2. Bricker, S.B., J.G. Ferreira, and T. Simas. 2003. An Integrated Methodology for Assessment of Estuarine Trophic Status. *Ecol. Modelling* 169: 39-60.
3. Ferreira, J.G., S.B. Bricker, T.C. Simas. 2007. Application and sensitivity testing of an eutrophication assessment method on coastal systems in the United States andEuropean Union. *Journal of Environmental Management*. Vol. 82(4): 433-445.
4. Bricker, S.B., B. Longstaff, W. Dennison, A. Jones, K. Boicourt, C. Wicks and J. Woerner. 2008. Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change. Special issue of *Harmful Algae* 8: 21-32.
5. Garmendia, M., S. Bricker, M. Revilla, A. Borja, J. Franco, J. Bald, and V. Valencia. 2012 Eutrophication Assessment in Basque Estuaries: Comparing a North American and a European Method. *Estuaries and Coasts* 35(4): 991-1006.

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