H2020

TOOL FACTSHEET

Tool name
WestLice

Tool type
Model (Biophysical connectivity)

Short description of the tool
The model consists of various components to predict the spread of sea lice between defined locations. This allows estimation of spread patterns and "connectivity" between salmon aquaculture sites, the identification of distinct self-contained units for management, and the assessment of potential impacts from new sites, coherent area management strategies, and strategic spatial planning for the industry.

The model uses the output of a hydrodynamic model "WestCOMS" to drive the movement of passive particles between defined sites (basic configuration uses salmon aquaculture sites). Output is in the form of text files describing spread densities from each site (total/snapshots), individual particle tracks, and dispersal connection probabilities between each site. Scripts have been written in Matlab and R have been used for analysis of outputs.

Source (where/ link)
Dr Thomas Adams, SAMS, Oban, PA347 1QA, UK
Java particle tracking code at: https://github.com/tomadams1982/WestLice

Licence cost or other type of costs (e.g. maintenance)

General requirements (technical and input data)
Formatted output data from hydrodynamic model (u,v,s,t), site locations, Configuration file to define options.

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)

Particle tracking and connectivity analysis can (and has been) used in diverse fields and applications. In the context of disease and parasite management for aquaculture (the purpose of the West Lice model), it is useful for assessing interactions between existing farms, identifying pathways for outbreaks, potential interactions with wild fish populations (spread and accumulation patterns), and in selection of new site locations

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

Used independently of site data to provide probabilistic outputs, or informed by site lice counts to track predict lice densities.

Limitations

Require lice count data to fully validate model. Potential to predict lice metapopulation dynamics but this is not well developed or validated.

Technical skills needed to operate the tool

R and/or Matlab experience required to use processing scripts.

Background knowledge needed to implement the tool

Appreciation of sea lice population dynamics required in order to understand limitations of model application.

How can the tool contribute to the EAA

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

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:

Argyll and Bute, Shetlands, Highlands and Islands counties, Scotland

Reference and link to case studies report:

www.aquaspace-h2020.eu

Other bibliographic references

Adams, T.P., Aleynik, D. & Black, K.D. (2016) Temporal variability in sea lice population connectivity and implications for regional management protocol. Aquaculture Environment Interactions, 8, 585–596.

Adams, T.P., Black, K., MacIntyre, C., MacIntyre, I. & Dean, R. (2012) Connectivity modelling and network analysis of sea lice infection in Loch Fyne, west coast of Scotland. Aquaculture Environment Interactions, 3, 51–63.

Adams, T.P., Proud, R. & Black, K. (2015) Connected networks of sea lice populations: dynamics and implications for control. Aquaculture environment Interactions, 6, 273–284.

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