

Sea Lice – Overview

Rob Raynard Marine Scotland Science Marine Laboratory Aberdeen

raynardr@marlab.ac.uk

Who are Marine Scotland?

- Marine management organisation in Scotland.
- Directorate of the Scottish Government - formed April 2009.
- Integrating scientific research, compliance monitoring, policy and management of Scotland's seas.
- Long term funding and work programme addressing sea lice management.



Tripartite Working Group: Sea trout netting

- TWG government funded initiative
- Information on lice burdens on wild trout collected during spring/ early summer
- Currently analysing data collected during 2001-2009.





Monitored site: Loch Torridon

- Sea trout examined in detail
- Plankton sampling used to examine density of lice in the environment
- Sentinel salmon
- Information collected on farm lice levels through local management group
- Acoustic tracking used to examine habitat use of sea trout
- Sampling of early returning fish undertaken to examine yearly changes in lice burdens





Loch Torridon Lice data

 Observed concentrations of copepodids and local farms year of production (Y1 or Y2)





Modelling sea lice dispersal

- Coupled model created for Loch Torridon area
- Hydrodynamic model generates currents
 - 100 m horizontal intervals, 15 depths
 - 10 minute time-steps
 - Wind, river and tidal forcing
- Particle model
 - Use 2-d surface currents to move particles
 - Simulates larval maturation
- Output locations of particles at given times

Influence of wind on simulated distribution of copepodids

Influence of wind: 7 day simulations b) SE wind a) NW wind c) NE wind S wind e) NW2 wind 10 0.1 100 1

- panels show all particles
- Wind is the dominant contributor to particle transport and dispersion
- can be seen to control export/retention.

Expansion of work to Loch Linnhe

- Understanding the dispersal of, and risk from sea lice, within Scottish coastal systems
 - 5 Year project starting April 2010
- Large area 60Km long
- Many partners in the work Marine Scotland, aquaculture industry, wild fisheries, Scottish Association for Marine Science
- Complex scenarios
- Dispersal and infection pressure between farms/farm groups
 - gradients
 - firebreaks



Objectives of Loch Linnhe work

- develop a validated coupled bio-physical model to predict sea lice dispersal within Loch Linnhe
- compare data on the movement of wild salmonids within the Loch Linnhe with predicted sea lice dispersal
- investigate effect of SLICE treatment of smolts on returning wild fish numbers (effect of inshore sea lice on wild fish population)
- investigate presence of immunosuppressive effect of attached sea lice on host

Outcomes from research in Loch Linnhe

- Prediction of areas where larval lice may be concentrated
- Evaluation of interactions between groups farms
- Evaluation of potential effects of changes to farm management, new farms/farm closures on larval lice distribution
- Informing establishment of management areas
- Evaluation of export (intra-regional) transport of lice
- Science that can be applied to modelling further large scale areas
- Improved knowledge of the effect of sea lice on salmonids
 - at the individual
 - at the population level

Regulation – Aquaculture and Fisheries (Scotland) Act 2007

- Inspections and audits of fish farm sites
 - Inspection sea lice, treatment record, stock
 - Audit all records; inspection of stock, audit of sea lice counting procedure; audit of treatment administration?
 - Enforcement action
- Industry Requirements
 - Satisfactory measures control prevention and reduction
 - Legislative requirements '2008 Record Keeping Order'
 - Industry Code of Good Practice



Regulation – Aquaculture and Fisheries (Scotland) Act 2007

- Industry Code of Good Practice
 - weekly counts 25 fish (5 fish from 5 cages)
 - suggested trigger 0.5 (Feb-June) 1 (July-Jan)
 L.s. adult female
 - management agreements
 - appropriate training
 - good practice in the use of medicinal products
- Record Keeping
 - training
 - lice counts
 - administration of medicinal products
 - methods to control /treat parasites
 - sea lice management groups



A CODE OF GOOD PRACTICE FOR SCOTTISH FINFISH AQUACULTURE

