UISCE

Understanding Irish Shellfish Culture Environments

by

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and

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MarCon Computations International ltd

Advanced Solutions to Engineering and Environmental Problems

Carrying Capacity – Tools, Results and User Perspectives
Wednesday, July 11th 2007

Presentation Overview

- Background to project.
- Project approach.
- Project team & roles.
- Work to date.
- Ongoing work.

Project Background

- Carrying Capacity and Water Quality
  - ISA/Aquaculture Forum level
- DCMNR asked BIM to address issue
- BIM team led by Dr. Terence O'Carroll
- Related research topics reviewed
- Potential partners identified & approached
- Consortium formed in Dec 06

Project Approach

UISCE GIS

BIM Project Team

- Project Director: Dr. Terence O'Carroll

- Project Coordinators: Brian O'Loan
  Benen Dallaghan

- Dive & Boat Team: John Dennis
  Geoff Robinson

- Pilot Bays: Fergal Guilfoyle
  Fabrice Richez
  Mary Hannon

- Administration: Michael Doorly
  Breda Smith

Project Partners

National Oceanic & Atmospheric Administration (USA)

Suzanne Bricker

MarCon Computations International (IRL)

Alan Berry

AquaFact International Services (IRL)

Brendan O'Connor

Plymouth Marine Laboratory (UK)

Anthony Hawkins

Longline Environmental (UK)

Joao Ferreira

Great Eastern Mussels (USA)

Carter Newell

Blue Hill Hydraulics (USA)

John Richardson

Martin Ryan Institute (IRL)

Michael Hartnett & Declan Clarke

Compass Informatics (IRL)

Gearoid O'Riain

Project Partner Roles

MarCon Computations International

- Hydrodynamic Modelling
- Water Quality Modelling
- Database / data assimilation program
- Coupling models
- Larval modelling
- Upscaling
- MarGIS™_UISCE GIS Application

Martin Ryan Institute

- Sample analyses
- Tidal basin facility
- PhD Research
- Shellfish studies
- Structure scale hydraulic modelling

Blue Hill Hydraulics

- Application of structures models
- Guide MRI structures modelling research

NOAA

- ASSETS™ model
- Model coupling with ECOWIN™

Longline Environmental

- ECOWIN™ & FARM™ models.
- Facilitate predation and resource competition simulation.
- Engage in economic analysis for Dungarvan and Killary.
- Advice on sampling program.

Project Partner Roles

Plymouth Marine Laboratory

- ShellSIM™ individual growth model
- Model coupling with MarCon
- Sampling program guidance
- Provision of training.
- Advice and assistance in simulation of relationship between water quality and shellfish hygiene, focusing upon (i) E.coli and (ii) HAB's.

Compasss Informatics

- WFD database guidelines & ISO Standards for Metadata.
- Register Metadata.
- Review historical data, identify and assist BIM with data acquisition.
- Integration of existing BIM databases.
- Develop Project Website

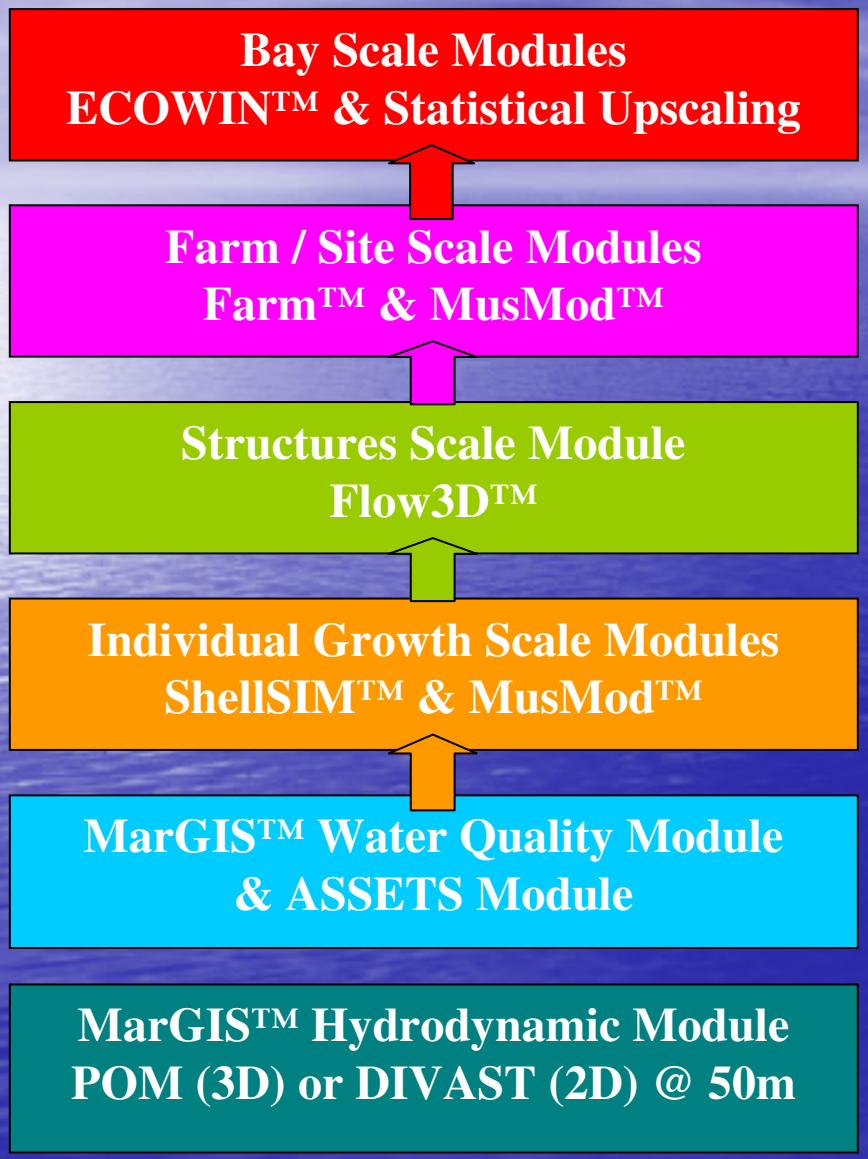
AquaFact International Services

- Bathymetric surveys
- Field sampling & surveys work.
- Report production.
- Assistance with sampling program

Great Eastern Mussels

- MusMod™ individual growth model
- MusMod™ farmscale model
- Model coupling with MarCon
- Husbandry recommendations
- Upscaling to bayscale with MarCon
- Advice on sampling program

Who's modelling what ?



Longline Environmental
Great Eastern Mussels
Blue Hill Hydraulics
MarCon Computations International

Longline Environmental
Great Eastern Mussels

Blue Hill Hydraulics

Great Eastern Mussels
Plymouth Marine Laboratory

NOAA
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Work to Date

- Consultation with industry, ISA, DCMNR
- Functional, technical, end-user requirements
- Historical data requested, analysed & evaluated
- Site visits, presentations and meetings with industry
- Numerical models developed
- Exchange of model codes
- Preliminary forcing of all models
- FTP site set up for data transfer
- Sampling program designed…….

Sampling Programme

Custom built filtration systems

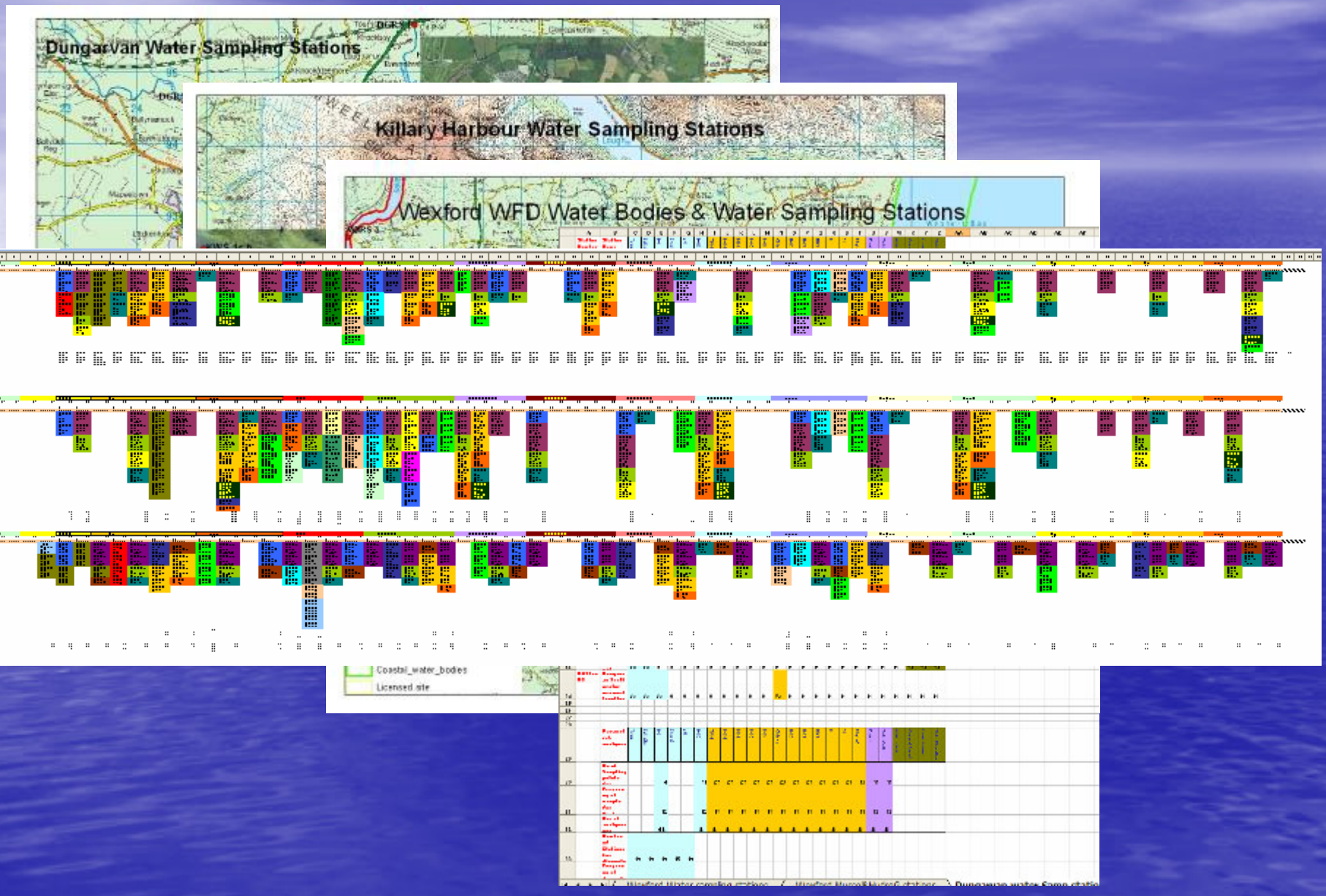
S4 Current Meter

Seabird CTD

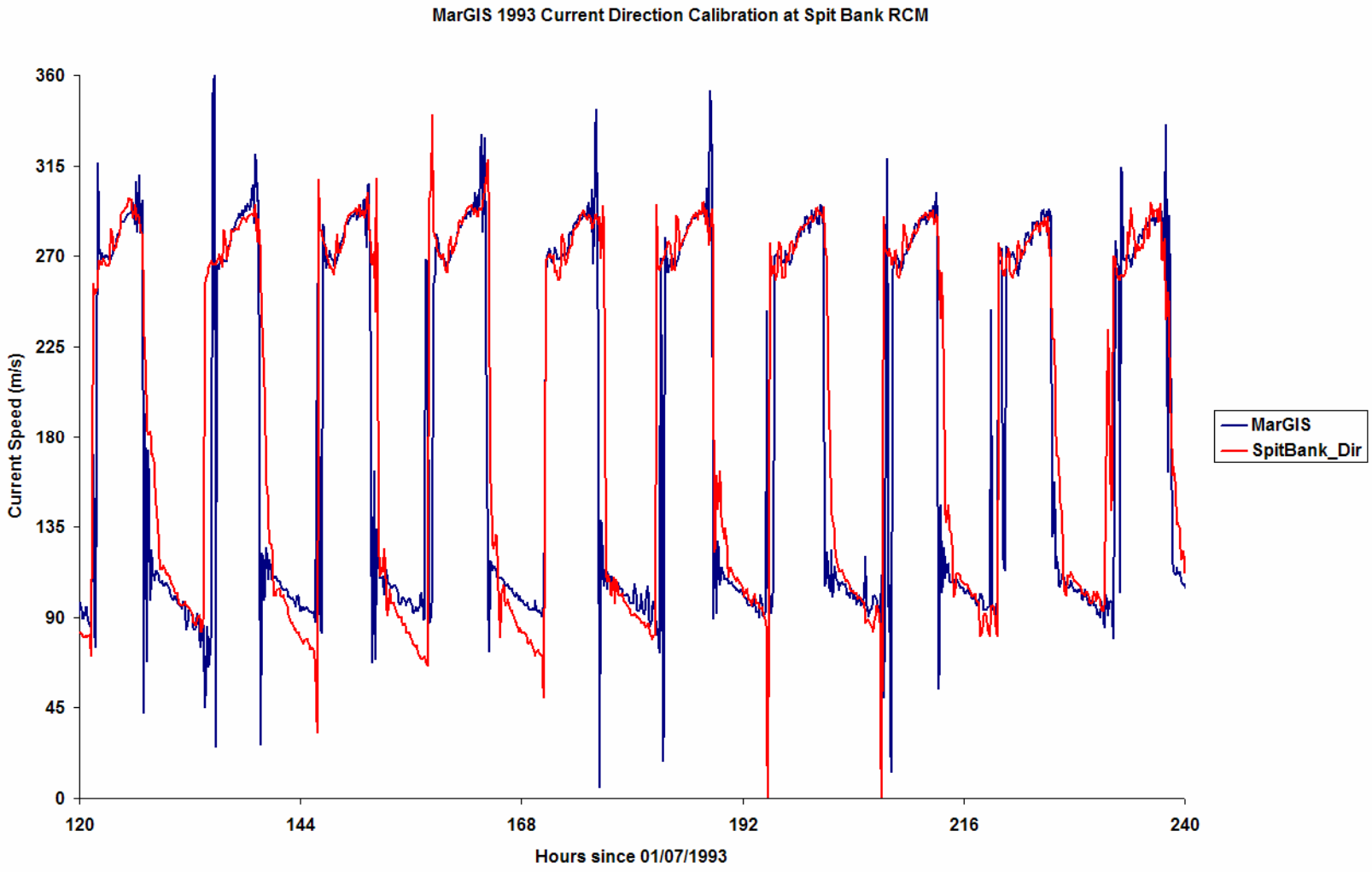
RCM9s &
RDCP600s

Datasonde
5X's

Sampling Programme



Numerical Modelling (I)



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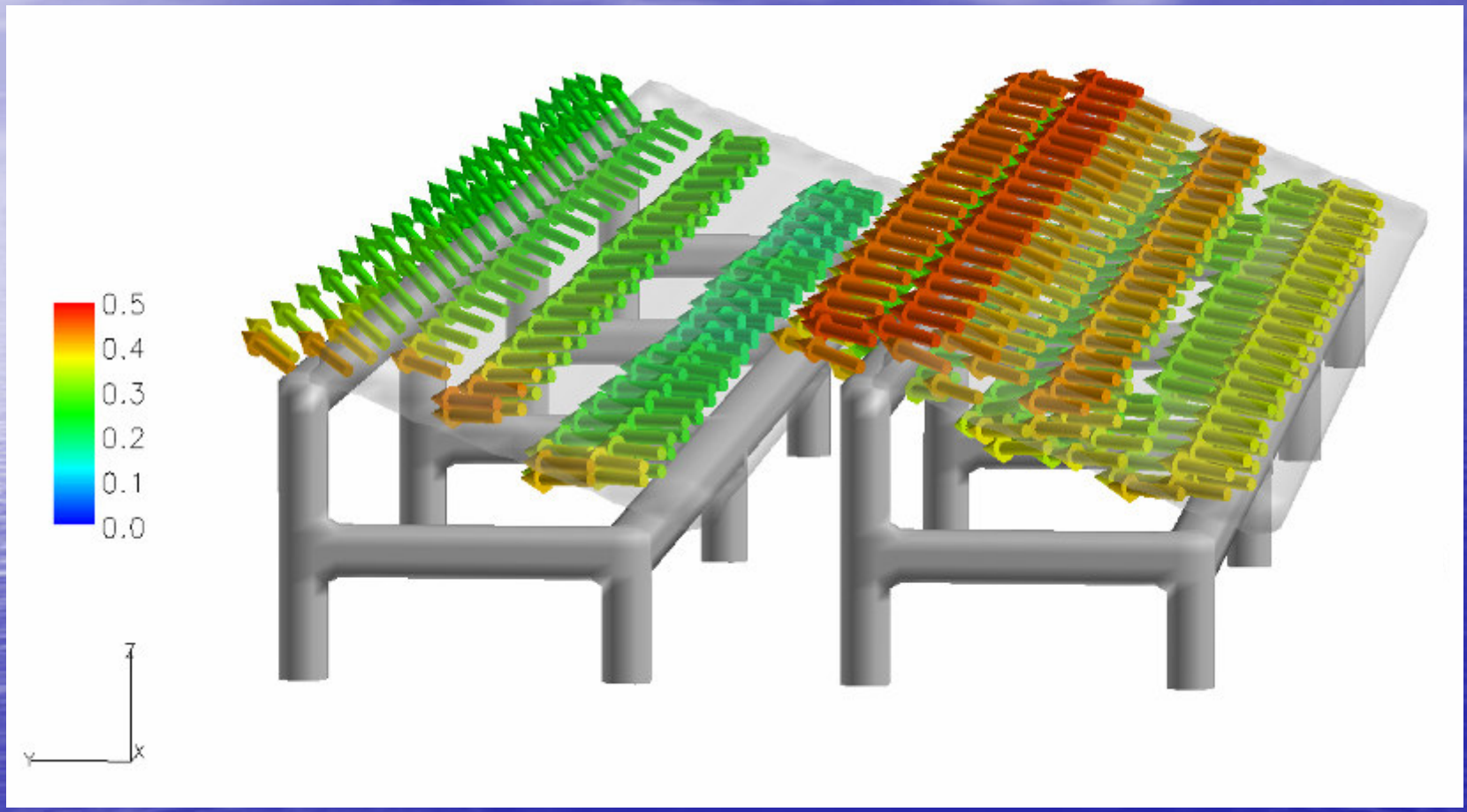
Numerical Modelling (II)



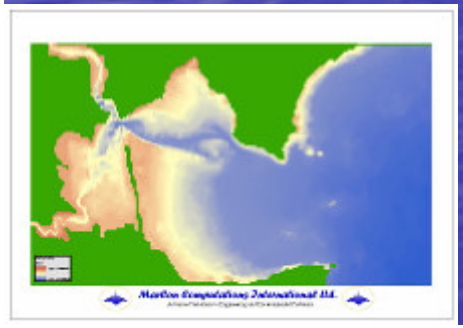
Ongoing Work (sampling & analysis)

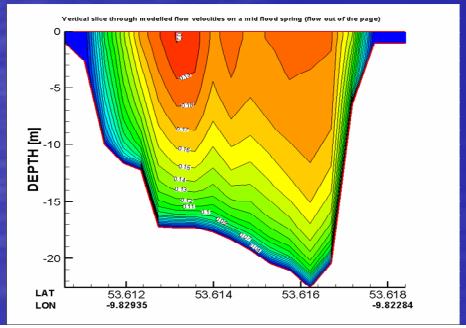
- Full standing stock surveys (GPS/Side Scan)
- Cohort study
- Water quality sampling + analyses
- Seston depletion studies.
- Shellfish biometric and mortality assessments.
- Filtration studies.
- Wild filter feeding vs aquaculture.
- Macroalgae /SAV assessment.
- Mussel seed mortality studies (hold,relay)
- Density dependent mortality (var. relay time, tons, etc)

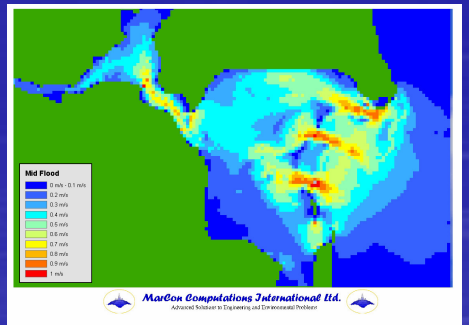


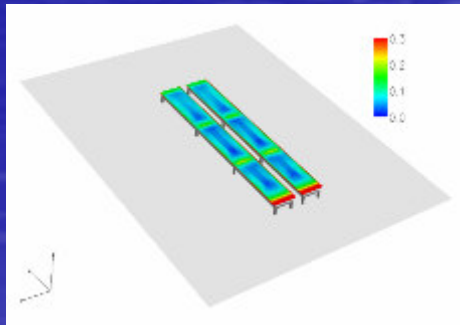

Upcoming Work (modelling)

- ‘Summer’ hydrographic surveys
- Calibration of hydrodynamic modules
- Development of water quality modules
- Calibration of ShellSIM™ module
- Refinement of ECOWIN™ model
- Refinement of ASSETS™ model
- Detailed structure scale hydrographic surveys.
- Calibration of Flow3D™ models









Summary

- Well structured project
- Good project management in place
- Project partners working well together
- Detailed sampling programme designed
- Preliminary results from numerical models are encouraging
- Large-scale sampling programme underway