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DAERA AWP

Aquaculture

Adele Boyd and Heather Moore

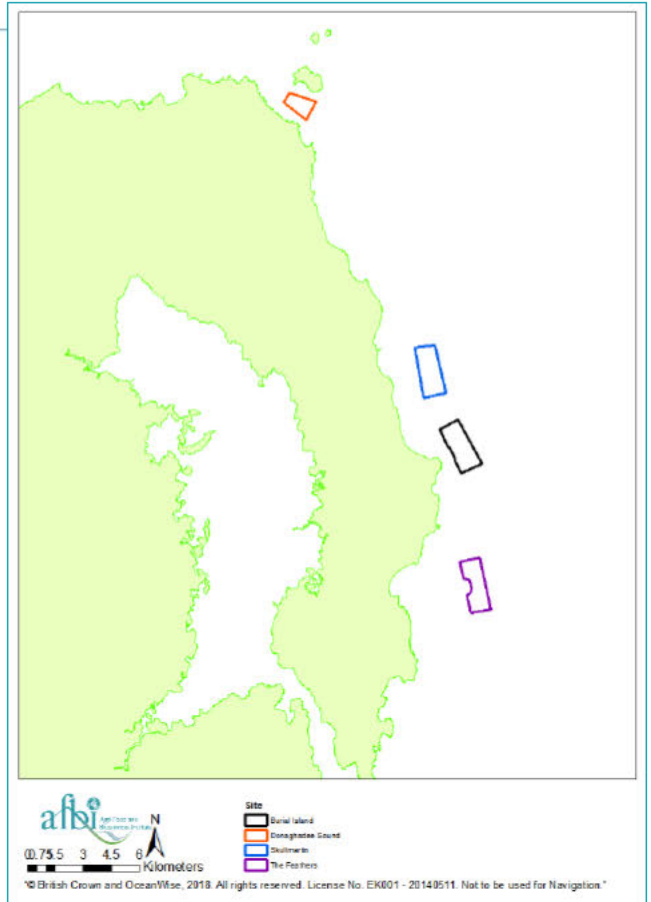
April 2021

afbini.gov.uk

44991: Seed mussel stock assessment surveys

The bottom cultivation of the blue mussel *Mytilus edulis* within Northern Ireland and Ireland is currently reliant on natural settlements of wild seed mussel beds.

AFBI undertake routine stock assessment surveys on behalf of the DAERA to identify and then quantify seed mussel beds within the Irish Sea. These beds are then dredged and the seed mussels relaid onto licensed aquaculture plots for ongrowing to marketable size.



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44991: Seed mussel stock assessment surveys

The current seed mussel stock assessment methodology has **two stages**. The first stage uses **acoustic RoxAnn surveys** followed by **targeted dredge tows**. Both of these surveys were undertaken utilising the DAERA FPV the Queen of Ulster.

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44991: Seed mussel stock assessment surveys

If there are any significant amounts of juvenile *Mytilus edulis* present, a second **towed camera stage** is undertaken to build on the initial ground truthing and provide a total area required for accurate stock assessment calculations using Optimal Allocation Analysis (OAA) (Strong and Service, 2011).

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Strong, J.A. and Service, M. (2011) Using Optimum Allocation Analysis to Improve Seed Mussel Stock Assessments. *Journal of Shellfish Research* 30 (1): 1-6.

44991: Seed mussel stock assessment surveys

Summer 2020 Surveys

- Four survey areas
- Craigbrain – no seed mussel found
- Skullmartin
  - Patchy seed bed found
  - Opening to fishing not recommended
- Burial Island
  - Seed mussel bed found
  - < 400 Tonnes
  - Seed bed <80m from *Modiolus*
- The Feathers
  - Fishable seed mussel bed found
  - Seed small <20mm
  - Tonnage estimated at approximately 800 Tonnes

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42098: Habitats Regulations Assessment

- European Council Directive 92/43/EEC (**Habitats Directive**) and European Council Directive 2009/147/EC (**Birds Directives**) were developed with the aims of **protecting habitats and species** considered to be of European interest.

- Member states designate sites as Special Areas of Conservation (**SAC**) for the protection of **habitats and species** and Special Protection Areas (**SPA**) for the protection of **wild birds.**

- Under The Environment (Northern Ireland) Order 2002 sites are designated as Areas of Special Scientific Interest (**ASSI**) for the protection of **flora, fauna, or geological, physiographical or other features**.

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42098: Habitats Regulations Assessment

- Work is ongoing on the development of a Habitat Regulations Assessment for proposed amendments to a Freshwater finfish farm near Cookstown.
- A site visit has been undertaken and a meeting held with the applicant.
- A draft document has been drawn up and it hoped to be completed by the end of April 2021.
- Work is ongoing on the development of Habitat Regulations Assessments for two new shellfish aquaculture sites within the Mill Bay are of Carlingford Lough.
    - Reports have been sent to DAERA for review
    - work undertaken on the review of the indicative Chlorophyll a standard recommended within these reports.

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42098: Habitats Regulations Assessment

- ICES working group for Environmental Interactions of Aquaculture.
  - The group had its 3rd annual meeting virtually via Webex from the 5th to the 7th of May 2020.
  - Lead the Shellfish subgroup and coordinated the production of chapter 4 Environmental impacts and recommendations for prioritized research – bivalve aquaculture, of the final report (http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/ASG/2020/WGEIA%20Report%202020.pdf).

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42098: Decision Support Tools

INTERREG VA funded SWELL project

Swell
SHARED WATERS ENHANCEMENT & LOUGHS LEGACY

Interreg
Northern Ireland - Ireland - Scotland
European Regional Development Fund

MATCH FUNDERS

Department of Agriculture, Environment and Rural Affairs

Department for Infrastructure

An Roinn Tithíochta, Pleanála, Pobail agus Rialtais Áitiúil
Department of Housing, Planning, Community and Local Government

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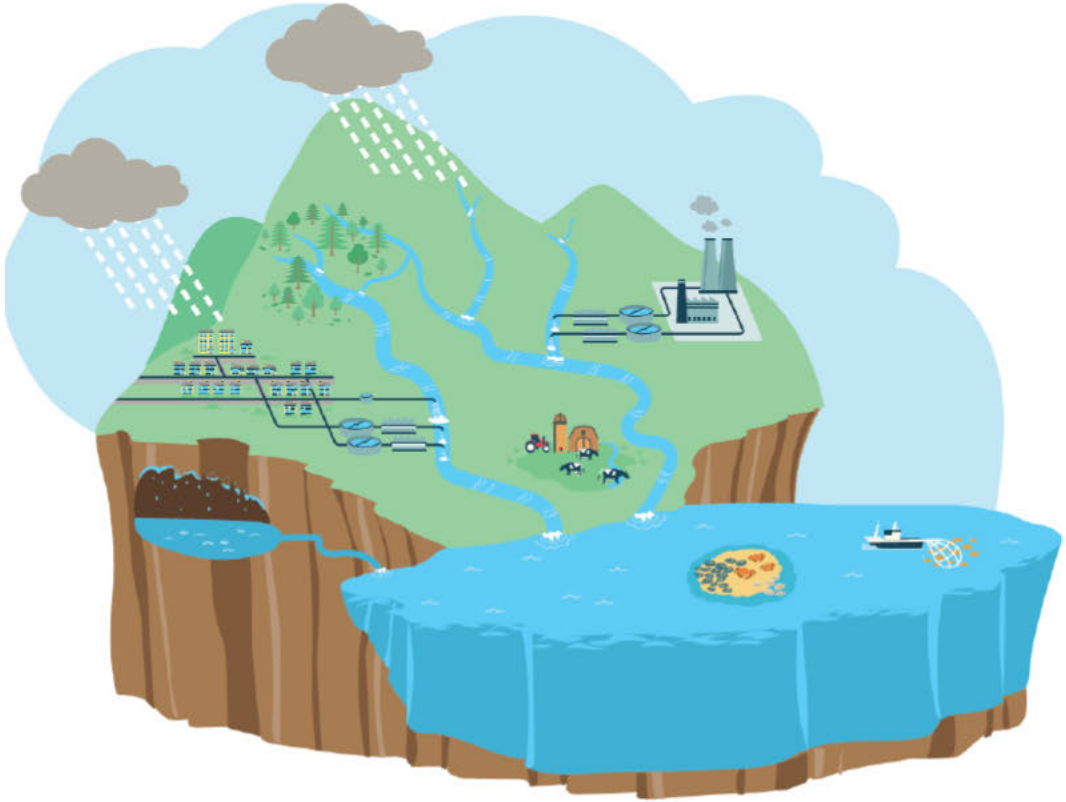
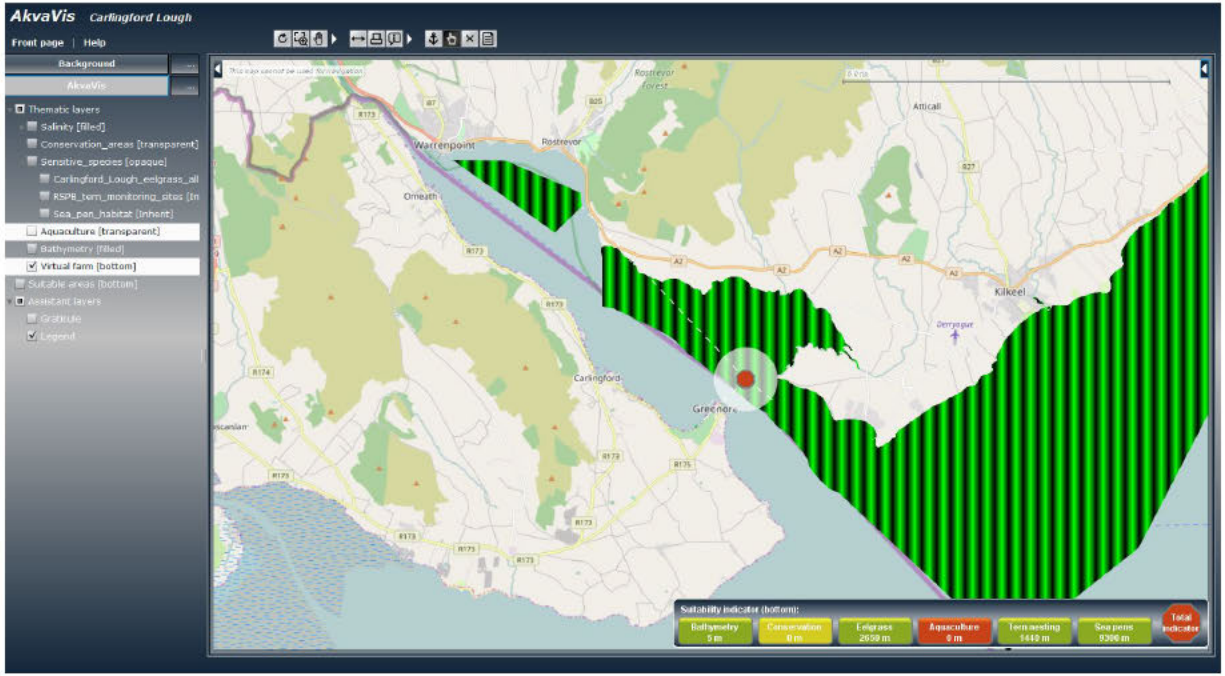
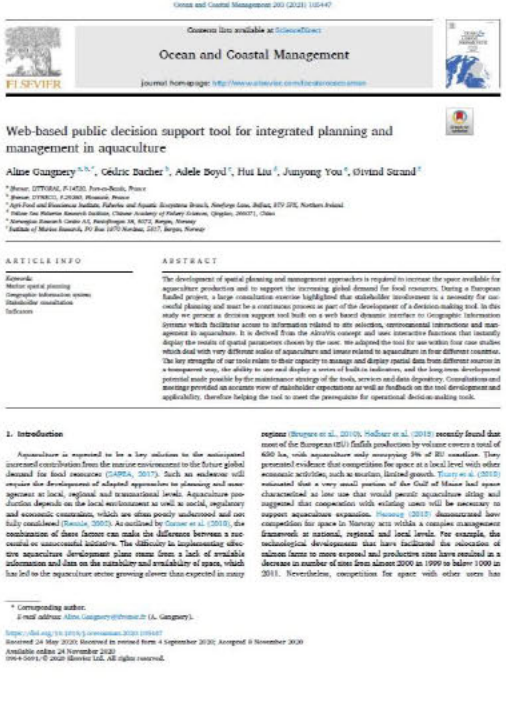


42098: Decision Support Tools





Ocean and Coastal Management

Web-based public decision support tool for integrated planning and management in aquaculture

Aline Gangnery, Cédric Bacher, Adele Boyd, Hui Liu, Junyong You, Øivind Strand

ARTICLE INFO

ABSTRACT

1. Introduction

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42098: Carlingford Aquaculture Review

- AFBI are currently involved in the EASME/EMFF funded, Supporting Implementation of Maritime Spatial Planning in the Atlantic region (SIMAtlantic) project.
- AFBI are leading a Case study on the Management of marine activities in a transboundary ecosystem, using Carlingford Lough as our example.
- This work will culminate in a practical guidance document to assist both regulators, developers and those working in the coastal region.
- This work is being undertaken in conjunction with UCC, DAERA and DHPLG.

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42098: Aquaculture site monitoring

- Currently monitoring 3 sites within Carlingford Lough (C15, C16 and C17). Sediment samples are collected for Particle Size Analysis (PSA) at 10 locations across these three licensed aquaculture sites within the Mill Bay area of Carlingford Lough.

- Currently monitoring sediment samples for PSA at 10 locations within the licensed aquaculture site in Dundrum Bay and at 5 locations within one licensed aquaculture site in Larne Lough (L3).

- Where possible all sites are sampled monthly, however some of this year's sampling has been interrupted due to COVID-19 restrictions.

- Sediment samples are sent to a subcontractor for analysis. Documents are currently in draft for each sea Lough assessing the potential impacts of aquaculture activities on the sediment composition within the vicinity of the proposed activity.

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42098: Aquaculture Science Strategy

- A draft proposal has been written for a project to develop "**A Sustainable Development Strategy for Northern Irelands Aquaculture Industry**".
- This has been forwarded to the HOB for comment.
- Hope to review the possibility of taking this forward within the 2021/2022 financial year.

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Carrying capacity models

- AFBI Activity code: 42127
- Focus on Small Bays; Dundrum and Larne
- Dundrum Ecosystem Model complete
- Similar to the catchment model developed during the Enhanced SMILE for Lough Foyle Ecosystem (EASE), enhanced to couple drainage area models to the SWAT model.

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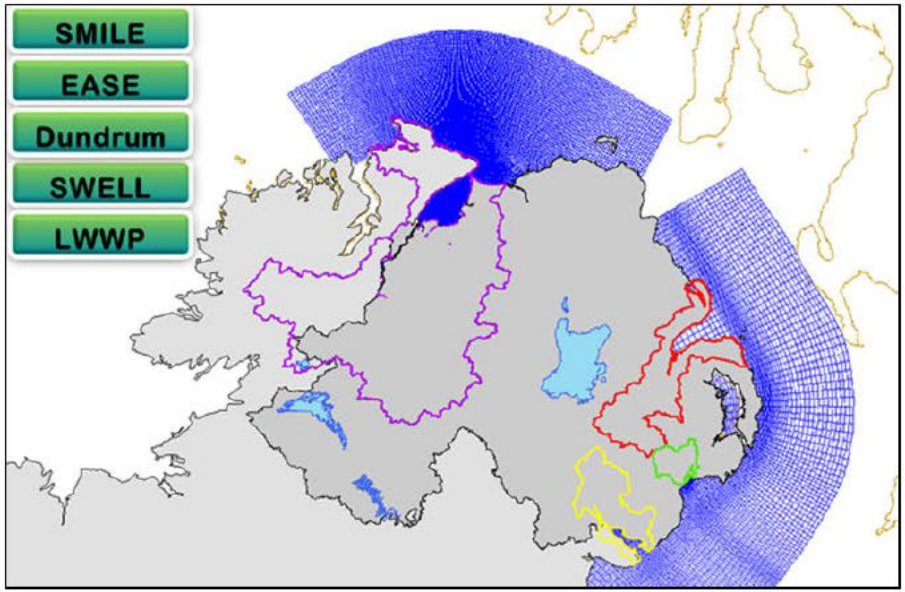
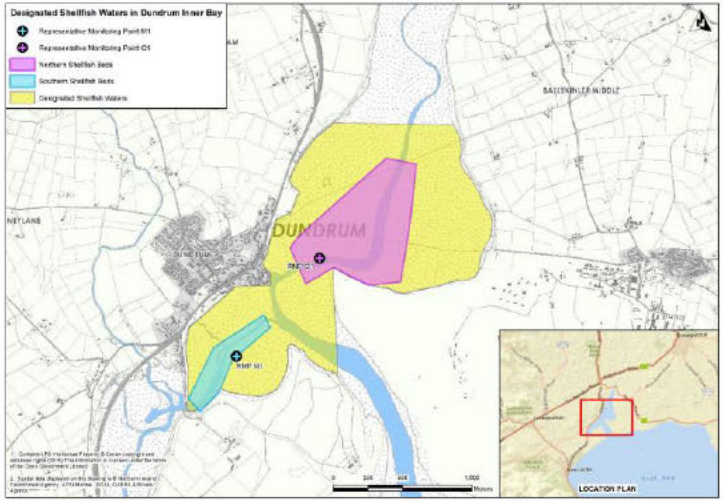
Integrated environmental monitoring modelling catchment loads to coastal systems

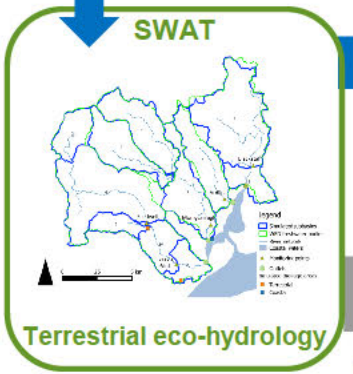


- Decline in WQ and shellfish classification
- To understand current sources /pathways Bacteria and nutrients

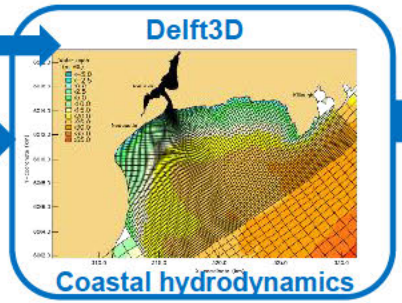


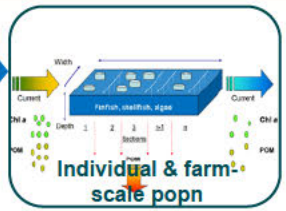
Integrated catchment management is required to properly manage resources

The multi-model cascade

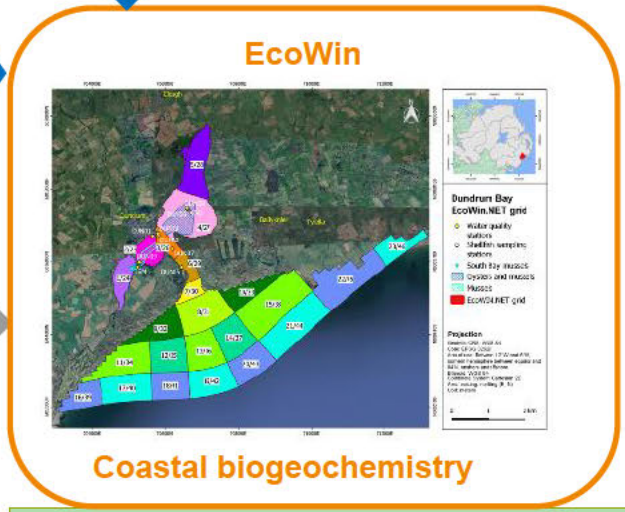


Flow





Nutrients: Dissolved Inorganic N and P
Sediments and Particulate Organic Matter



SUCCESS Framework: System for Understanding Carrying Capacity, Ecological, and Social Sustainability

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Nutrient and substance balance
Primary production
Aquaculture yield

Dundrum Ecosystem model - outputs

Bacteria

Table showing Relative contributions of individual sources to the total E. coli exports (sources contributing to less than 1% are not indicated).

Source	Name	Contribution to total E. coli exports
Urban	Annsborough Park WwTW CSO	28%
	Clough CSO	15%
	Annsborough WwTW FE	6%
	Septic tanks 7	3%
	Main Street Three CSO	1%
	Urban Total	**54%**
Diffuse	Subbasin 1	11%
	Subbasin 3	8%
	Subbasin 9	7%
	Subbasin 6	6%
	Subbasin 7	4%
	Subbasin 4	4%
	Subbasin 10	2%
	Subbasin 8	1%
	Subbasin 2	1%
	Subbasin 11	1%
	Diffuse Total	**46%**

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Dundrum Ecosystem model - outputs

Nutrients

Table showing Relative contributions of individual sources to total TON, NH4 and TP entering Dundrum Bay (sources contributing to less than 1% are not displayed).

Source	Name	Contribution to TON	Contribution to NH4	Contribution to TP
Urban	Annsborough WwTW FE	2%	5%	34%
	Clough FE	1%	1%	6%
	Dundrum WwTW	1%	9%	5%
	Maghera	0%	1%	2%
	Drumaroad	0%	0%	1%
	Clough CSO	0%	6%	1%
	Leitrim	0%	0%	1%
	LoughinIsland	0%	1%	1%
	Annsborough Park WwTW CSO	0%	6%	7%
	Mourneview Newcastle WwPS ERO	0%	1%	0%
	Septic tanks 7	0%	4%	1%
	Urban Total	**5%**	**39%**	**60%**
Diffuse	Subbasin 6	16%	17%	5%
	Subbasin 7	14%	8%	4%
	Subbasin 2	13%	4%	1%
	Subbasin 1	11%	11%	10%
	Subbasin 9	11%	3%	3%
	Subbasin 3	9%	9%	9%
	Subbasin 4	8%	2%	4%
	Subbasin 10	5%	3%	1%
	Subbasin 8	4%	1%	1%
	Subbasin 11	2%	1%	1%
	Diffuse Total	**95%**	**61%**	**40%**

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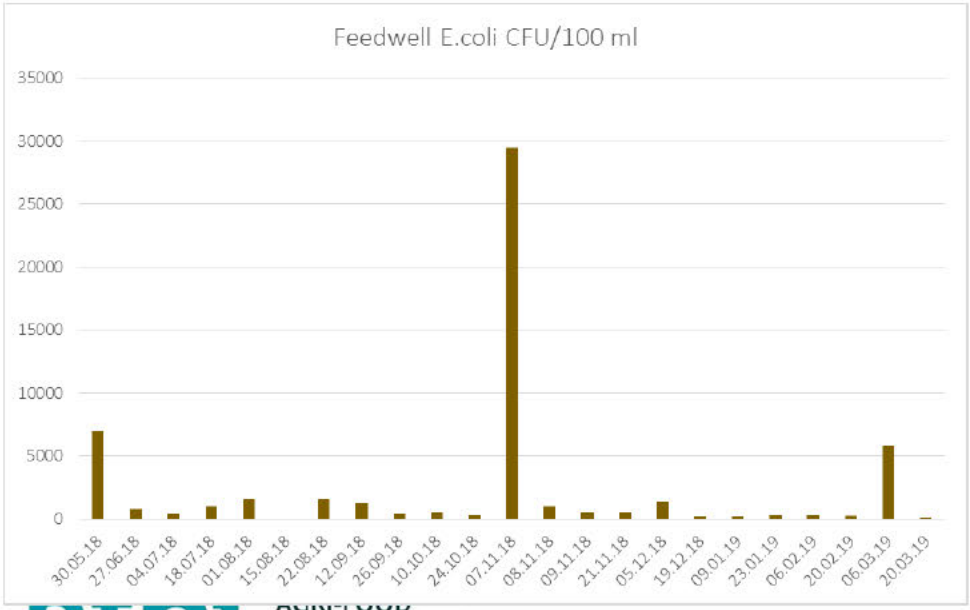
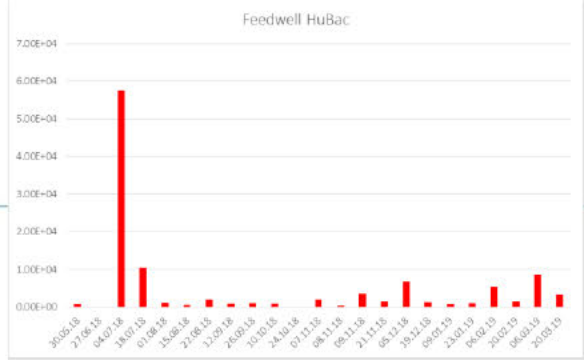
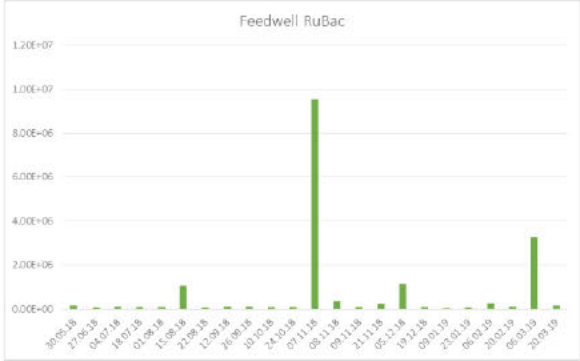
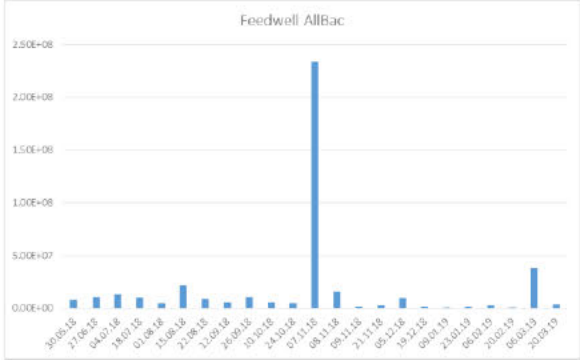
Feedwell, Carrigs River – *E.coli* CFU/100ml water plus

Hu Bac
RuBac
All Bac









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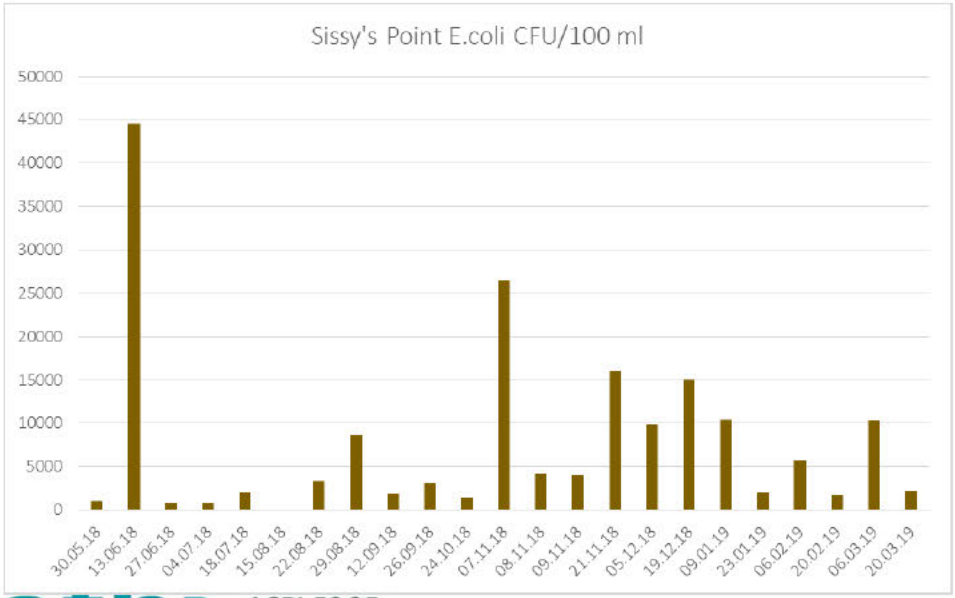
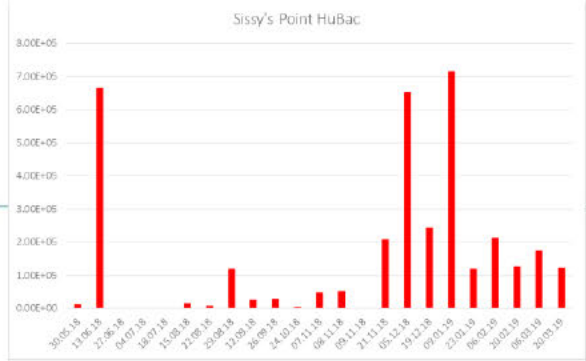
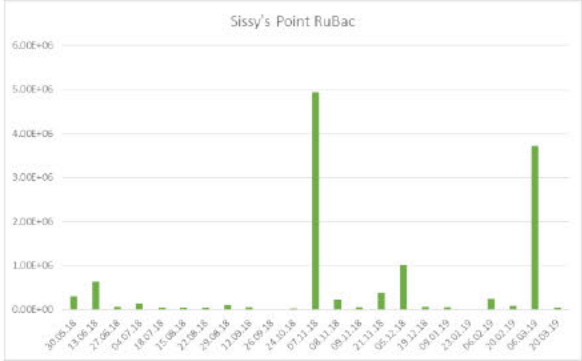
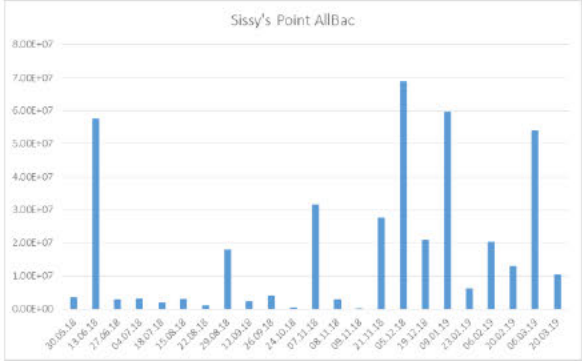
Sissy's Point,Carrigs River – *E.coli* CFU/100ml water plus

Hu Bac
RuBac
All Bac









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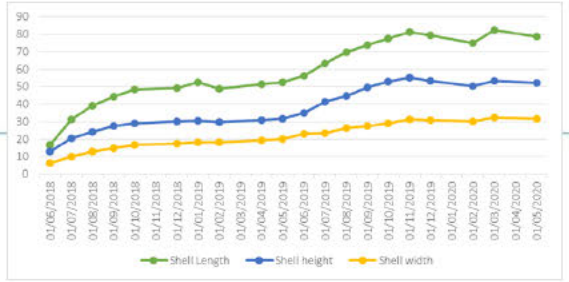
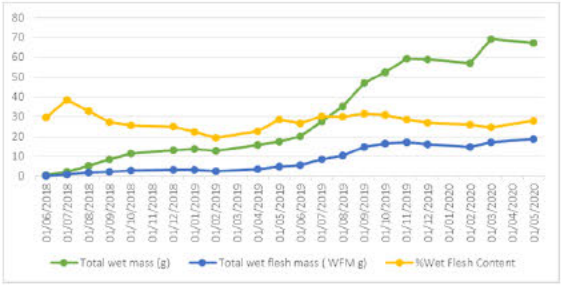
Larne shellfish growth trials





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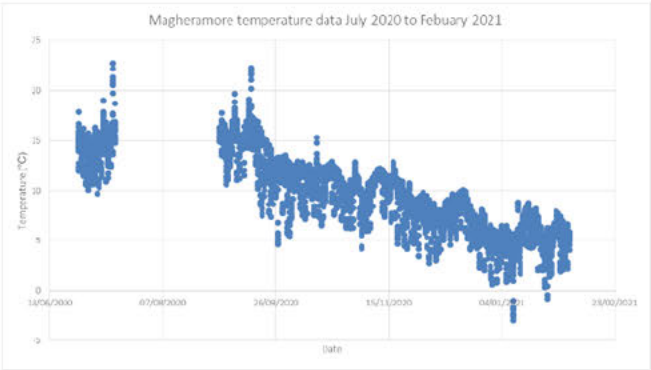
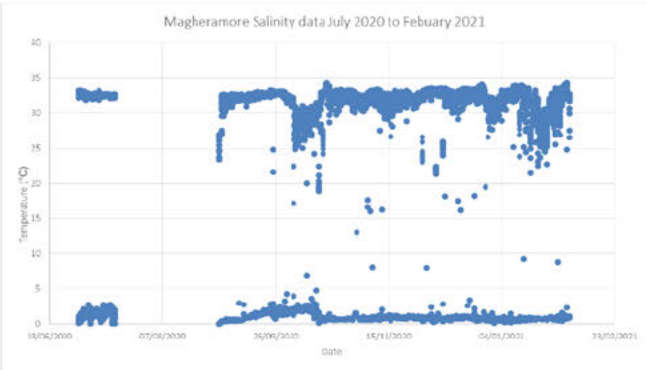
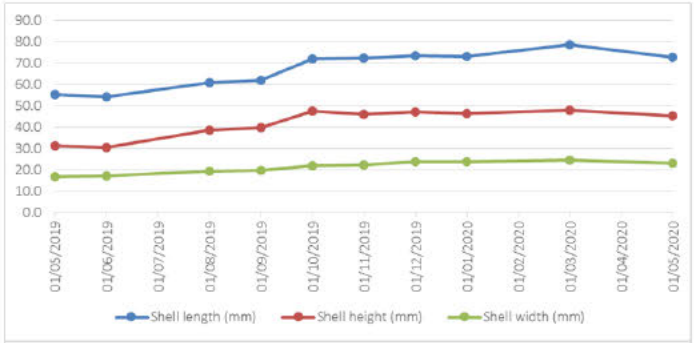


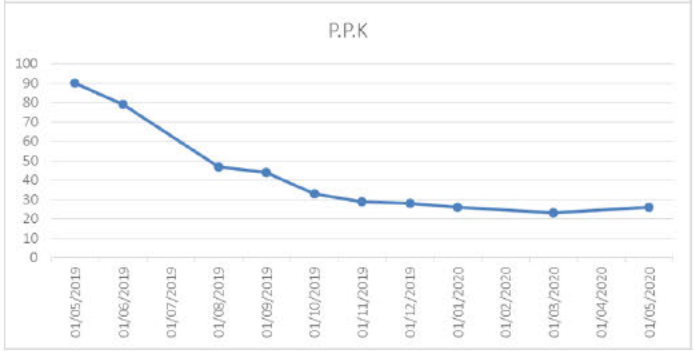


Dundrum shellfish growth trials plus – novel methods

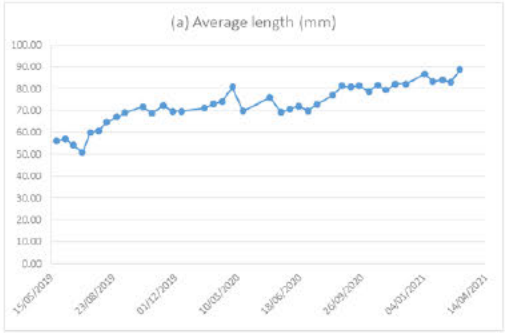
Dundrum shellfish growth trials plus – novel methods

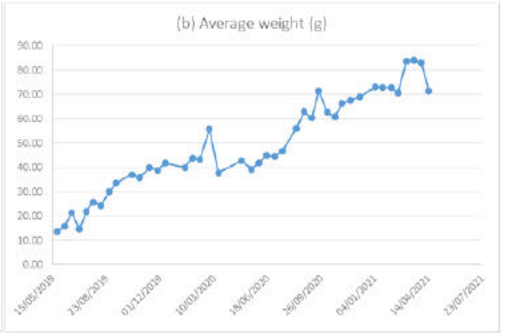
Destructive



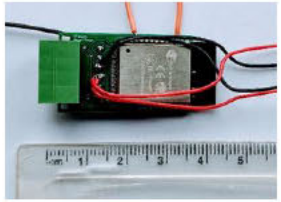


Non-destructive





Dundrum – H2020 GAIN



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Shellfish management

- AFBI Activity code: 42098
- Factors affecting *E.coli* concentrations in mussels from Belfast Lough
- Investigating rainfall and tidal state

□ Class A – **80% of sample results ≤230 *E.coli*/100g, no results exceeding 700 *E.coli*/100g – molluscs can be harvested for direct human consumption.**
□ Class B - **90% of sample results must be less than or equal to 4600 *E. Coli*/100g with none exceeding 46000 E. Coli/100g - molluscs can go for human consumption after purification in an approved establishment or after relaying in a classified relaying area or after an EC approved heat treatment process.**
□ Class C - **≤46000 *E. Coli*/100g - molluscs can go for human consumption only after either:** • relaying for at least two months in a classified Class B relaying area followed by purification in an approved establishment, or after an EC approved heat treatment process, or • relaying for at least two months in a classified Class A relaying area, or • an EC approved heat treatment process
□ Prohibited areas[1] (>46000 E. Coli/100g) **- molluscs must not be subject to production or be harvested.**

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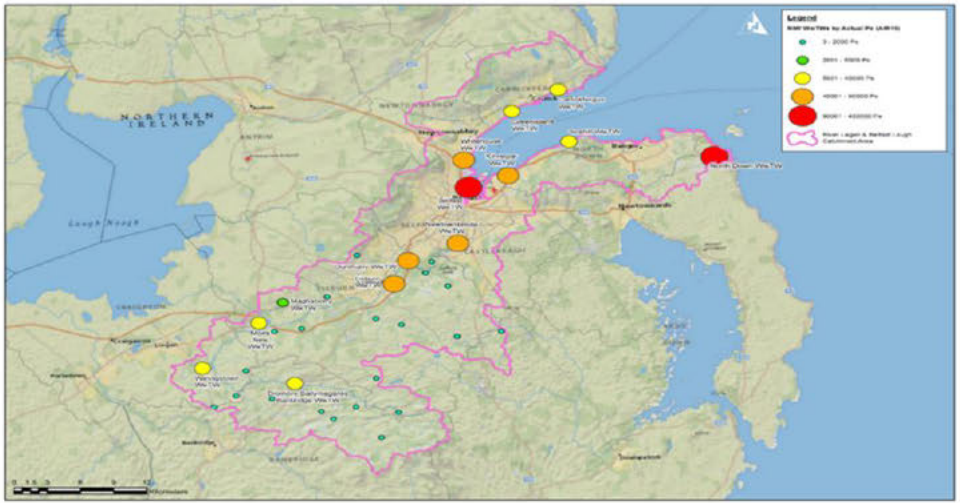
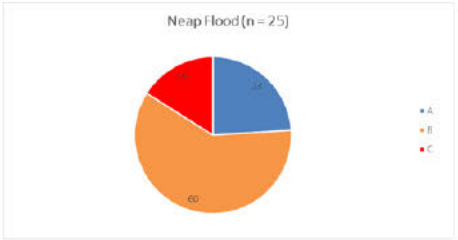
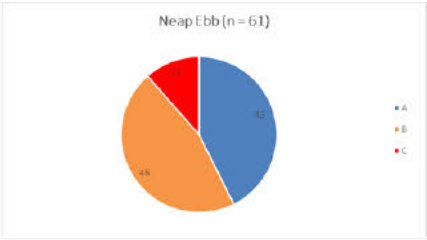
DASSHH

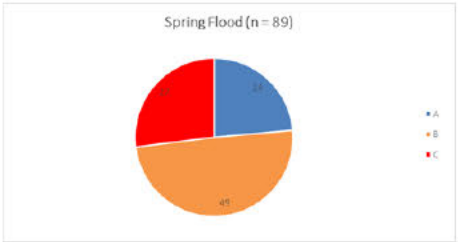
Developing an assurance scheme for shellfish and human health (DASSHH)

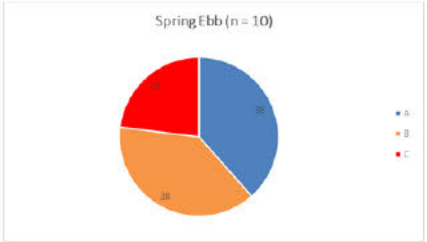


Pie charts showing the % of category A, B and C classification results of mussel flesh sampled on different states of the tide for B4 mussel samples (FBO's own samples).









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Thank you
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