

Application for Consent to conduct
Marine Scientific Research

Date: 10th January 2019

1. General Information

1.1 Cruise name and/or number: CV19018
Dates: 05-11 July 2019

1.2 Sponsoring Institution(s):	
Name:	Earth and Ocean Sciences, National University of Ireland, Galway
Address:	University Road, Galway
Name of Director:	Dr. Martin White

1.3 Scientist in charge of the Project:	
Name:	Dr. Robin Raine
Country:	Ireland
Affiliation:	EOS, National University of Ireland, Galway
Address:	University Road, Galway
Telephone:	+353 87 2474135
Fax:	+353 91 525005
Email:	robin.raine@nuigalway.ie
Website (for CV and photo):	https://www.nuigalway.ie/ryaninstitute/research/marine/

1.4 Entity(ies)/Participant(s) from coastal State involved in the planning of the project:	
Name:	(None)
Affiliation:	
Address:	
Telephone:	
Fax:	
Email:	
Website (for CV and photo):	

2. Description of Project

2.1 Nature and objectives of the project:
<p>This survey is an investigation into the distribution of the dinoflagellate <i>Dinophysis</i> spp. in the eastern and southeastern Celtic Sea, a region part of which is known to harbour high densities of <i>Dinophysis</i>, often in thin layers. The water sampling will be based on the use of the CTD rosette, supplemented by deployments of a finescale sampler and a submersible pump (attached to CTD frame). On board microscopy will allow the determination of both vertical and horizontal distributions of <i>Dinophysis</i> in near real time. In particular, the development of <i>Dinophysis</i> near tidal mixing fronts will be addressed.</p>

2.2 If designated as part of a larger scale project, then provide the name of the project and the Organisation responsible for coordinating the project:
N/A

2.3 Relevant previous or future research projects:

1. 2005-2008. HABIT (EU FP6). Harmful Algal Blooms In Thin layers. Joint project with partners Ireland (NUI Galway), France (Ifremer, Brest), Spain (IOE, Vigo), Britain (CEFAS)
2. Previous related research has also been carried out by the PI (Dr. Robin Raine) in 2018 (CV18020), 2016 (CV16025), 2015 (CV15013, CV15017), 2014 (CV14012) and 2013 (CV13019) all of which took place in the eastern and northern Celtic Sea region in early July. Otherwise, earlier related work has been limited to waters off the south west of Ireland.

2.4 Previous publications relating to the project:

Raine R, Cosgrove S, Fennell S, Gregory C, Barnett M, Purdie D, and Cave R. 2017. Origins of *Dinophysis* blooms which impact Irish aquaculture. In (L. Proenca and G Hallegraeff Eds.) *Proceedings of the 17th International Conference on Harmful Algae, 9-14 October 2016 Florianópolis, Brazil*. ISSHA/IOC/UNESCO, Paris Pp 46-49.

Farrell, H., Velo-Suarez, L., Reguera, B. and R. Raine. 2014. Phased cell division, specific division rates and other biological observations of *Dinophysis* populations in sub-surface layers off the south coast of Ireland. *Deep Sea Research II*, 101, 249-254.

Farrell, H., Gentien, P., Fernand, M., Lunven, M., Reguera, B., Gonzales-Gil, S. and R. Raine. 2012. Scales characterising a thin layer of *Dinophysis acuta* Ehrenburg and its transport within a coastal jet. *Harmful Algae*, 15, 36-46.

Raine, R., McDermott, G., Silke, J., Lyons, K., Nolan, G. and C. Cusack. 2010. A simple model for the prediction of harmful algal events in the bays of southwestern Ireland. *Journal of Marine Systems*, 83, 150-157.

Raine, R., Farrell, H., Gentien, P., Fernand, L., Lunven, M., Reguera, B., and S. Gonzalez Gill. 2010. Transport of toxin producing dinoflagellate populations along the coast of Ireland within a seasonal coastal jet. ICES CM 2010/N:05.

Raine, R., McDermott, G., Silke, J., Lyons, K., Nolan G., and C. Cusack. A short range prediction model for forecasting HAB events in the bays of southwestern Ireland. ICES CM 2010/N:06.

3. Geographical Areas

3.1 Indicate geographical areas in which the project is to be conducted (with reference in Latitude and longitude in decimal degrees, including coordinates of cruise/track/way points/sampling stations). Please provide coordinates in a separate excel spreadsheet.

Geographical areas: Northeastern Celtic Sea; southern St George's Channel; approaches to the Bristol Channel; Labadie Bank; western approaches to the English Channel

Latitude: 49.65 to 52.25 deg N
Longitude: 4.5 to 8.6 deg W

3.2 Attach chart(s) at an appropriate scale (1 page, high-resolution) showing the geographical Areas of the intended work and, as far as practicable, the location and depth of sampling Stations, the tracks of survey lines, and the locations of installations and equipment.

Chart section is attached at end of document. Indicative CTD lines are shown on the chart. CTD stations will be 3-4 km apart along these proposed lines. The precise position of the lines may change slightly depending on sea surface temperature satellite imagery

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4. Methods and means to be used

4.1 Particulars of vessel:	
Name:	R.V. Celtic Voyager
Type/Class:	100 A1 Research Vessel, LMC
Nationality (Flag State):	Irish
Identification Number (IMO/Lloyds No.):	
Owner:	Marine Institute
Operator:	P&O Maritime Services
Overall length (meters):	31.4
Maximum draught:	4m
Displacement/Gross Tonnage:	340
Propulsion:	Wärtsilä UD25M5 (626 kW),
Cruising & maximum speed:	<= 10 knots
Call sign:	EIQN
INMARSAT number and method and capability of communication (including emergency frequencies):	GMDSS A class, E-mail. Mini M SAT C and GSM 00 353 91 423396 / 00870 763066755 00870-764687325 / 764687326
Name of Master:	Philip Baugh/Colin McBrearty
Number of Crew:	7
Number of Scientists on board:	8 max

4.2 Particulars of Aircraft: (none)	
Name:	
Make/Model:	
Nationality (flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall Length (meters):	
Propulsion:	
Cruising & Maximum speed:	
Registration No.:	
Call Sign:	
Method and capability of communication (including emergency frequencies):	
Name of Pilot:	
Number of crew:	
Number of scientists on board:	
Details of sensor packages:	
Other relevant information:	

4.3 Particulars of Autonomous Underwater Vehicle (AUV): (None)	
Name:	
Manufacturer and make/model:	
Nationality (Flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall length (meters):	
Displacement/Gross tonnage:	
Cruising & Maximum speed:	
Range/Endurance:	
Method and capability of communication	

(including emergency frequencies):	
Details of sensor packages:	
Other relevant information:	

4.4 other craft in the project, including its use: (None)

4.5 Particulars of methods, full description of scientific instruments to be used (for fishing gear specify type and dimension) and location			
Types of samples and Measurements:	Methods to be used:	Instruments to be used:	To be carried out within 12nm (yes or no):
Temperature, salinity	CTD	CTD	Yes
Phytoplankton	Water bottles and nets	Water bottles and nets	Yes

4.6 Indicate nature and quantity of substances to be released into the marine environment:
(None)

4.7 Indicate whether drilling will be carried out. If yes, please specify:
No

4.8 Indicate whether explosives will be used. If yes, please specify type and trade name, Chemical content, depth of trade class and stowage, size, depth of detonation, frequency of Detonation, and position in latitude and longitude:
No

5. Installations and Equipment

Details of installations and equipment (including dates of laying, servicing, method and Anticipated timeframe for recover, as far as possible exact locations and depth, and Measurements):
No moorings or equipment on moorings will be deployed

6. Dates

6.1 Expected dates of first entry into and final departure from the research area by the research vessel and/or other platforms:
Entry: 05 July 2019
Departure: 11 July 2019

6.2 Indicate if multiple entries are expected:

7. Port Calls

7.1 Dates and Names of intended ports of call:
(None)

7.2 Any special logistical requirements at ports of call:
(None)

7.3 Name/Address/Telephone of shipping agent (if available):
N/A

8. Participation of the representative of the coastal State

8.1 Modalities of the participation of the representative of the coastal State in the research Project:
To contact Dr. Robin Raine (NUI Galway) and research vessel operations (Irish Marine Institute) for details. Note that Dr. Keith Davidson (SAMS, Oban Scotland) is in communication with Dr. Raine.

8.2 Proposed dates and ports for embarkation/disembarkation:
Cork: 05 July 2019 Cork: 11 July 2019

9. Access to Data, Samples and Research Results

9.1 Expected dates of submission to coastal State of preliminary report, which should include The expected dates of submission of the data and research results:
30 August 2019

9.2 Anticipated dates of submission to the coastal State of the final report:
30 January 2020

9.3 Proposed means for access by coastal State to data (including format) and samples:
E-correspondence with PI (Dr. Robin Raine)

9.4 Proposed means to provide coastal State with assessment of data, samples and Research results:
Assessment of data, samples will be included in the Final Report

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples
And research results:

E-correspondence with PI (Dr. Robin Raine)

9.6 Proposed means of making results internationally available:

International scientific literature

10. Other permits Submitted

10.1 Indicate other types of coastal state permits anticipated for this research (received or
Pending):

(None)

11. List of Supporting Documentation

11.1 List of attachments, such as additional forms required by the coastal State, etc.:

N/A

Signature:

A handwritten signature in blue ink that reads "R Raine". The signature is written in a cursive style with a large, stylized 'R'.

Name: Dr. Robin Raine

Country: Ireland

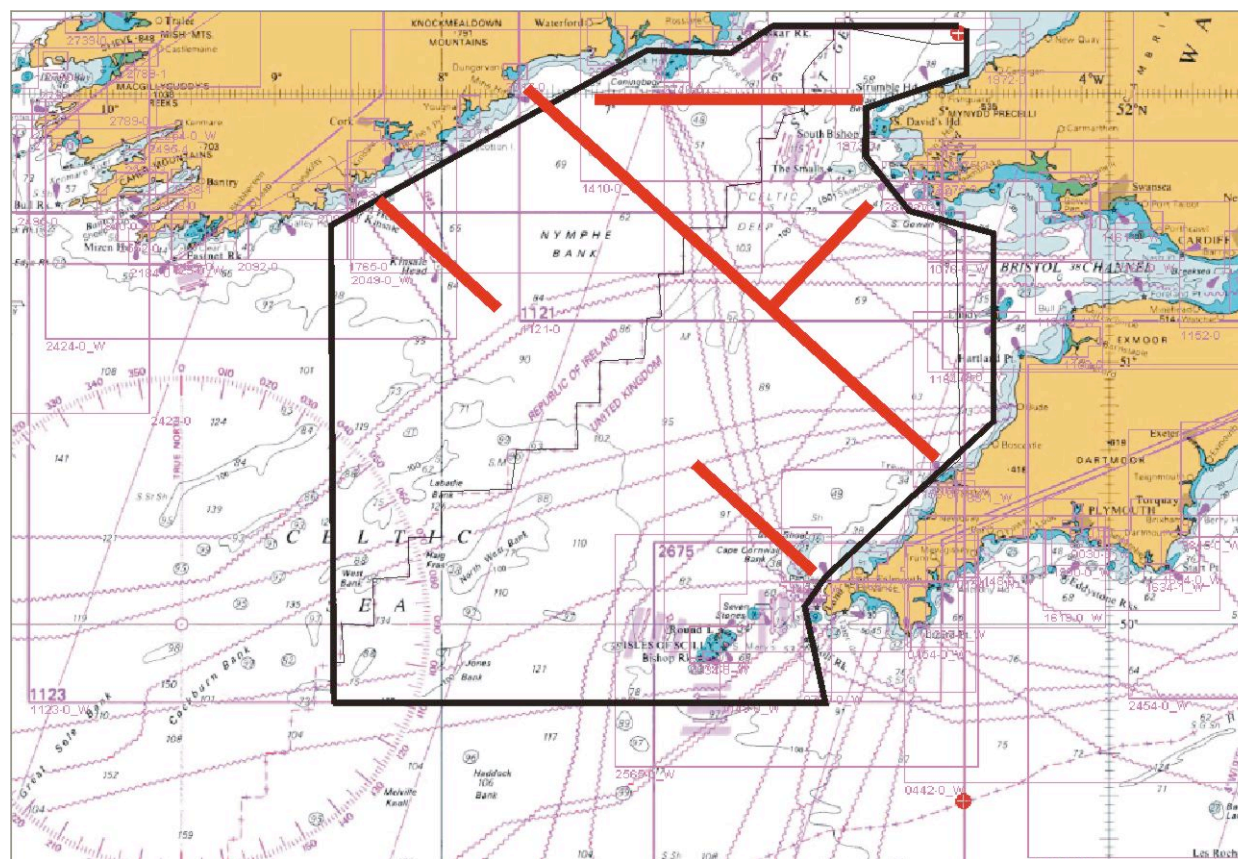
Affiliation: Earth and Ocean Sciences and The Ryan Institute, National University of Ireland,
Galway

Address: University Road, Galway

Telephone: +353 87 2474135

Fax: +353 91 525005

Email: robin.raine@nuigalway.ie



Proposed Sampling locations: CV19018. Black lines indicate proposed survey area. Red lines show indicative lines which will be sampled using CTDs and plankton nets. The precise location of the CTD lines will be dependant on the exact position of the tidal fronts (Celtic Sea Front), tidally mixed waters and other water characteristics during sampling. This information will be derived from sea surface temperature satellite derived data.