NOTIFICATION OF PROPOSED RESEARCH CRUISE

Part A: GENERAL

1. Name of research ship: **RV Pelagia** **Cruise number: 64PE455**

2. Cruise dates: 8 May – 23 May 2019

3a. Operating authority: NIOZ Royal Netherlands Institute for Sea Research
Telephone: (+31) (0)222-369300
Telefax: (+31) (0)222-319674

3b. Operating agent: NIOZ Royal Netherlands Institute for Sea Research
Telephone: (+31) (0)222-369300
Telefax: (+31) (0)222-319674

4. Owner: NIOZ Royal Netherlands Institute for Sea Research

5. Particulars of ship:

name:	Pelagia
nationality:	Dutch
overall length:	66.00 meters
maximum draught:	4.00 meters
nett tonnage:	1553 NRT
propulsion:	2 diesel electric Elliot White Gill Bow Truster
call sign:	PGRQ
IMO nr:	9001461

6. Crew:

name of master:	J.C. Ellen / B. Puijman
number of crew:	12

7. Chief scientist: name: Dr. Herman Hummel
address: Korringaweg 7, 4401 NT Yerseke, NL

telephone: +31 113 577484
e-mail address: herman.hummel@nioz.nl

8. Geographical area in which the ship will operate:
(with reference in latitude and longitude)
North Sea, between 52.5N to 56.5 N and 5.0E to 1.0W

9. Brief description of purpose of cruise: Foodweb research North Sea with emphasis on ecology of phytoplankton, zooplankton, benthic animals, seabirds marine mammals and fouraging behaviour and interspecific interactions of charismatic megafauna.

10. Names and dates of intended ports of call:

Departure: 8 May 2019, Texel, Netherlands
Arrival: 23 May 2019, Texel, Netherlands

11.Any special logistic requirements at ports of call: N.A.

Part B: DETAIL

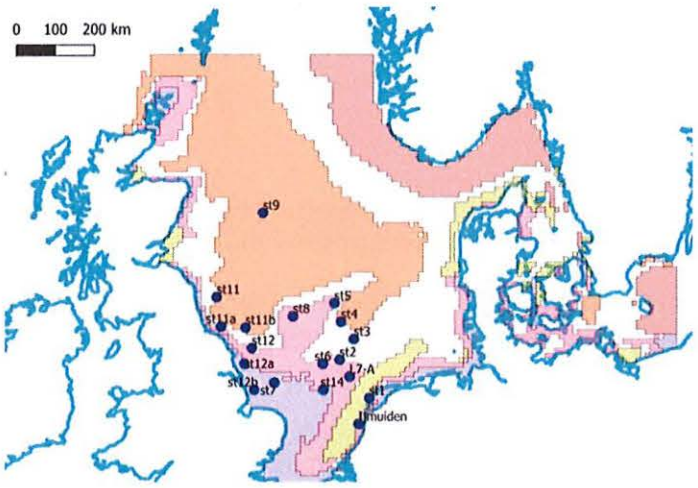
1. **Name of research ship: RV Pelagia**

2. **Cruise dates:** 8 May -23 May 2019

3. **Purpose of research and general operational methods:**

   This research is part of the NIOZ research and monitoring into the functioning of the North Sea Ecosystem. Water sampling will take place with Niskin Bottles, sediment samples (of selected stations) with box corers, net tows for zooplankton and the vertical "structure" of the water column, together with some basic water quality parameters will be measured using depth profiles of a CTD (conductivity, Temperature, Depth) sensor, which is also equipped with sensors for algal biomass, oxygen concentration, light penetration and turbidity. During sailing from station to station automated on-line measurements of phytoplankton biomass and photosynthetic activity will be made. Megafauna surveys are conducted as contribution to an international monitoring programme and will focus on habitat characteristics and associated behaviour of charismatic megafauna in contrasting parts of the North Sea (between the coast and tidal fronts, at the fronts and beyond).

4. **Attach chart showing (on an appropriate scale) the geographical area of the intended work, positions of intended stations/hydrographic sections:** The stations visited are shown on the map below Transects will follow a zig-zag course to and from to maximise the number of crosses of frontal zones and entries to and from particular water masses.



5a. Type of samples required:

- Water samples (for nutrients, algae, eDNA, microplastics)
- Sediment samples (for sediment composition, benthic animals and exchange of nutrients between the sediment and the water column)
- Net tows for zooplankton
- Visual observation of sea birds and sea mammals

5b. Methods by which samples will be obtained (including dredge/core/drill techniques):

- Water samples will be taken by CTD- Rosette sampler
- Sediment samples will be taken using a box corer
- Zooplankton will be samples using net tows
- Birds and sea mammals will be visually observed
- Multibeam
- Vibrocorer

6. Details of moored equipment: N.A.

7. Explosives: N.A.

8. Detail and reference of:

a. Any relevant previous/future cruises:

Aardema, H. M., M. Rijkeboer, A. Lefebvre, A. Veen, and J. C. Kromkamp. 2018. High resolution in situ measurements of photosynthesis and abundance in the Dutch North Sea. Ocean Sciences **submitted**.

Camphuysen C.J., B. Scott & S. Wanless 2006. Distribution and foraging interactions of seabirds and marine mammals in the North Sea: multi-species foraging assemblages and habitat-specific feeding strategies. In: Boyd I.J., Wanless S. and Camphuysen C.J. (eds) Top predators in Marine Ecosystems: monitoring change in upper trophic levels: 82-97. Cambridge Univ. Press, Cambridge.

Scott B.E., J. Sharples, O.N. Ross, J. Wang, G.J. Pierce & C.J. Camphuysen 2010. Sub-surface hotspots in shallow seas: fine scale limited locations of marine top-predator foraging habitat indicated by tidal mixing and sub-surface chlorophyll. Mar. Ecol. Progr. Ser. 408: 207-226.

b. Any previous published research data relating to the proposed cruise:

(Attach separate sheet if necessary)

9. Names and addresses of scientists of the coastal state in whose waters the proposed cruise takes place with whom previous contact has been made:

Joint Nature Conservancy Council, seabirds team, Aberdeen, Mark Lewis, Registered Office: Monkstone House, City Road, Peterborough, Cambridgeshire PE1 1JY. http://jncc.defra.gov.uk/

Andy Webb, Managing Director, Phoenix Court, Earl Street, Cleator Moor, Cumbria, CA25 5AU, Tel: +44(0)1224 040436, Mob: +44(0)7850 766491, andy.webb@hidefsurveying.co.uk, www.hidefsurveying.co.uk

10. State: U.K.

a. Whether visits to the ship in port by scientist of the coastal state concerned will be acceptable: N.A, we will not attend a port

b. Whether it will be acceptable to carry on board an observer from the coastal state for any part of the cruise and dates and ports of embarkation/-disembarkation: Yes

c. When research data from intended cruise is likely to be made available to the coastal state and if so, by what means: By publication in open, peer reviewed scientific journals and the data will be stored in publicly accessible databases (after publication of the results of after 2 years of the cruise date, whichever comes first)

SCIENTIFIC EQUIPMENT **COASTAL STATE:** U.K

11. Complete the following table - include a separate copy for each coastal state (indicate "Yes" or "No" if applicable)

Marine scientific equipment used	**water depth (m)**	**fisheries research**	**distance of research to coast in nautical miles**			
			< 3	**3-12**	**12-50**	**50-200**
CTD	0-bottom	No	No	yes	yes	yes
NISKIN bottle	0-bottom	No	No	yes	yes	yes
Box corer	bottom	No	No	yes	yes	yes
Zooplankton net	0-bottom	No	No	yes	yes	yes
Binoculars	0	No	No	yes	yes	yes
Multibeam	5-bottom	no	no	yes	yes	yes
Vibrocorer	bottom	no	no	yes	yes	yes

List of intended sampling stations during Pelagia cruise

station	latitude	longitude
st1	53.18574	4.795903
L7-A	53.65	4.08
st2	54.01673	3.71765
st3	54.45744	4.232013
st4	54.81697	3.766383
st5	55.2034	3.526109
st6	53.92712	3.105884
st7	53.52156	1.3308
st8	54.93361	2.019561

st9	57.0425	0.913371
st11	55.33602	-0.78187
st11a	54.71944	-0.62175
st11b	54.69672	0.273404
st12	54.26745	0.506651
st12a	53.92985	0.234263
st12b	53.36948	0.586964
st13	53.52156	1.3308
st14	53.36677	3.126309
Ijmuiden	52.61562	4.402557

References

Aardema, H. M., M. Rlijkeboer, A. Lefebvre, A. Veen, and J. C. Kromkamp. 2018. High resolution in situ measurements of photosynthesis and abundance in the Dutch North Sea. Ocean Sciences **submitted**.

Alguero-Muniz, M., S. Alvarez-Fernandez, P. Thor, L. T. Bach, M. Esposito, H. G. Horn, U. Ecker, J. A. F. Langer, J. Taucher, A. M. Malzahn, U. Riebesell, and M. Boersma. 2017. Ocean acidification effects on mesozooplankton community development: Results from a long-term mesocosm experiment. PLoS ONE **12**.

Benedetti-Cecchi, L., T. Crowe, L. Boehme, F. Boero, A. Christensen, A. Grémare, F. Hernandez, J. C. Kromkamp, E. Nogueira García, G. Petihakis, J. Robidart, I. Sousa Pinto, and A. Zingone. 2018. Strengthening Europe's Capability in Biological Ocean Observations.in Á. Muñiz Piniella, P. Kellett, K. Larkin, and J. J. Heymans, editors. Future Science Brief 3 of the European Marine Board. European Marine Board, Ostende.

Camphuysen C.J., B. Scott & S. Wanless 2006. Distribution and foraging interactions of seabirds and marine mammals in the North Sea: multi-species foraging assemblages and habitat-specific feeding strategies. In: Boyd I.J., Wanless S. and Camphuysen C.J. (eds) Top predators in Marine Ecosystems: monitoring change in upper trophic levels: 82-97. Cambridge Univ. Press, Cambridge.

Kromkamp, J., E. Capuzzo, and C. J. M. Philippart. 2017. Measuring phytoplankton primary production: review of existing methodologies and suggestions for a common approach.

Maat, D. S., and C. P. D. Brussaard. 2016. Both phosphorus- and nitrogen limitation constrain viral proliferation in marine phytoplankton. Aquatic Microbial Ecology 77:87-97.

Thyssen, M., S. Alvain, A. Lefebvre, D. Dessailly, M. Rijkeboer, N. Guiselin, V. Creach, and L. F. Artigas. 2015. High-resolution analysis of a North Sea phytoplankton community structure based on in situ flow cytometry observations and potential implication for remote sensing. Biogeosciences 12:4051-4066.