

APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH

I. General Information

1.1 Cruise name and/or number:	F2025-008 - RS152510-SVIC
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1.2 Sponsoring institution(s):		
Name	Address	Name Of Director
Lindblad Expeditions	Science Committee Lindblad Expeditions 2505 2nd Ave, Suite 300 Seattle, WA. 98101 212-765 -7740 science@expeditions.com	Ashley Knight, Fleet Science/Expedition Science Committee
National Geographic Society	The National Geographic Headquarters 1145 17th Street, NW Washington, DC 20036 Phone: 202-857-7000 tleonardo@ngs.org	Teresa Leonardo, Senior Director, Ocean Science & Innovation Programs

1.3 Scientist in charge of the project:	
Name:	Rachael Miller
Country:	United States
Affiliation:	Rozalia Project for a Clean Ocean
Address:	PO Box 75 Granville, VT 05747 United States
Telephone:	8025786120
Email:	rachaelzoemiller@gmail.com

1.4 Entity(ies) /Participant(s) from coastal State involved in the planning of the project:	
Name:	See Section 6.2
Country:	
Affiliation:	
Address:	
Telephone:	
Fax:	
Email:	
Website (for CV and photo):	

1.5 Submitting officer:	
Name:	Ashley Knight
Affiliation:	Lindblad Expeditions
Address:	United States
Telephone:	858-349-8231
Fax:	
Email:	ashleyk@expeditions.com

2. Description of Project

2.1 Nature and objectives of the project:

The primary objectives of our research are to:

- Investigate microplastic and anthropogenic microfiber in the air and surface waters throughout our voyage on the NG Resolution with National Geographic-Lindblad Expeditions, including the surface waters/air along the expedition cruise track.
- Engage onboard guests and field staff as citizen scientists to complete the sampling, taking action to understand the problems our ocean faces and, in turn, be inspired to be part of the solutions.
- Further refine CSI for the Ocean's methods and equipment. This program was inspired by and uses forensic science methodology to utilize affordable equipment and accessible techniques so people of all ages can engage in meaningful and robust science that provides data that supports solutions to the problem of microplastic and anthropogenic microfiber pollution. Locations where these methods have been tested and deployed to date include the Hudson River in New York State, the Hawaiian Archipelago, Greenland, Arctic Svalbard, fjords of Norway, Faroe Islands, Iceland, Falkland Islands, South Georgia and Antarctica. Using the same methods along the expedition route of the NG Resolution (Svalbard, Jan Mayen, Greenland and Iceland) will provide valuable information for this growing global database.
- Share the data from our sampling openly, making it accessible to community members, fellow scientists, and all stakeholders interested in microplastic and anthropogenic microfiber pollution.
- Use the data from this expedition and beyond to underpin the development and deployment of solutions to microplastic and particularly microfiber pollution. Our global dataset, as it grows, will have the power to build the will and momentum for solutions that range from inspiring innovation in textile design and manufacturing (alternative materials such as outerwear made from algae, for example) to supporting regulation and policies to installing proper filters on laundry machines - both washers and dryers - to educating consumers on clothing care habits that reduce microfiber production and extend the life of their clothing. These are solutions that will benefit all of the coastal states we visit and beyond.

2.2 Relevant previous or future research projects:

The same research has been conducted from the same National Geographic-Lindblad Expeditions vessel and her sister ship, the National Geographic Endurance, under the same Visiting Scientist program on five previous cruises. They include "Arctic Svalbard and the Fjords of Norway" in June 2023, "Falklands, South Georgia and Antarctica" in November 2023, "Coastal Wonders of Norway, Shetlands, Faroes and Iceland" in June/July 2024 and two of the "Voyage to Antarctica" in December 2024. Additionally, this same research has been conducted in the Hudson River, USA (the entire river) and in the Hawaiian Archipelago by the same scientist and originator of the program, Rachael Miller.

Consent for each Coastal State for "Coastal Wonders of Norway, Shetlands, Faroes and Iceland" in June/July 2024 was sought and obtained through the RATS Portal, Cruise #F2024-029.

2.3 Previous publications relating to the project:

Rachael Miller and her team have published several peer-reviewed papers on the topic of microplastic and anthropogenic microfiber pollution including those based on field work, establishing the effect dryers have on microfiber pollution and establishing best practices to reduce procedural contamination in the field and lab while conducting this type of research. Those papers include:

Miller et al., Mountains to the Sea: River study of plastic and non-plastic microfiber pollution in the northeast USA, Marine Pollution Bulletin, 2017: <https://www.sciencedirect.com/science/article/abs/pii/S0025326X17306094>

Gwinnett and Miller, Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles, Marine Pollution Bulletin, 2021: <https://doi.org/10.1016/j.marpolbul.2021.113095>

Kapp and Miller, Electric Clothes Dryers: An underestimated source of microfiber pollution, PLOS One, Oct. 7, 2020: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239165> (open access)

Miller et al., Microplastic and anthropogenic microfiber pollution in the surface waters of the East River and Long Island Sound, USA, Regional Studies in Marine Science, Feb. 2024: <https://www.sciencedirect.com/science/article/abs/pii/S2352485523005509>

Additionally, our team created StoryMaps of each expedition detailing and explaining both the results and how those results suggest specific actions. Find all of the Storymaps at: <https://www.rozaliaproject.org/csi-for-the-ocean>

The two that are specific to the Arctic are:
bit.ly/CSIfortheOceanArctic2023
<https://bit.ly/CSIfortheOceanSubarctic2024>

3. Geographical Areas

3.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude, including coordinates of cruise track/ way points):

Note: Following is the Draft Itinerary. These locations not exclusive nor are they necessarily the final destinations. Final destinations may change depending on the conditions (atmospheric, sea state and ice). Additionally, the Visiting Scientist has no influence over the intended (above) or the final destinations, those are determined by the Captain and Expedition Leader working within the ship's own operational permits.

Date	Location	Lat/Long	Notes
6/25/2025	Longyearbyen, Norway	78.22°N 15.65°E	Embarkation
6/26/2025	Lillehookbreen	79.3973°N 11.7292°E	
	Signehamna	79.2723°N 11.5343°E	
6/27/2025	Texas Bar	79°36'02"N 12°52'07"E	
	Monacobreen	79°23'54"N 12°36'24"E	
	Moffen	80°00'N 14°30'E	
6/28/2025	Crozierpynten	79.919°N 16.840°E	
	Alkefjellet	79.5848°N 18.4608°E	
6/29/2025	Torellneset	79°21'49"N 20°44'06"E	
	Sundneset	78°12.3'N 021°03.8'E	
	Negribreen	78°34'48"N 19°02'18"E	
6/30/2025	Kapp Lee/Dolerittneset	78.1149°N, 20.8282°E	
	Diskobukta	77.93°N 21.46°E	
7/1/2025	At sea to Jan Mayen	At sea	
7/2/2025	Batik, Jan Mayen	70.9169°N 8.7209°W	
7/3/2025	Romer Fjord, Greenland	70°30'N 25°00'W	
7/4/2025	Nansens Fjord	68°18'N 29°53'W	
7/5/2025	Exploring		
7/6/2025	At Sea - crossing the Denmark Strait	At sea	
7/7/2025	Isafjordur, Iceland	66°04'33"N 23°07'36"W	
	Vigur	66.055°N 22.828°W	
7/8/2025	Dyjandi	65°43'57"N 23°11'55"W	
7/9/2025	Reykjavik	64°08'45"N 21°56'33"W	Disembarkation

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 provided - see Section 10.1.

4. Methods and Means to be Used

4.1 Particulars of Vessel:	
Name:	National Geographic Resolution
Type/Class:	Ship : R/V
Nationality (Flag state):	Bahamas
Identification Number/Lloyds #/MMSI #:	311 000 893
Owner:	Lindblad Maritime Enterprises
Operator:	Lindblad Expeditions
Overall length:	118m
Maximum draught:	5.7m
Displacement/Gross tonnage:	12,786.0
Propulsion:	2x ABB Azipods
Cruising:	10
Maximum speed:	
Call sign:	
INMARSAT number and method and capability of communication (including emergency frequencies):	
Name of master:	Heidi Norling & Martin Grasser
Number of crew:	112
Number of scientists on board:	1

4.2 Other craft in the project, including its use:

In addition to taking samples from the ship, water samples will also be collected from any one of the ship's many Zodiacs/inflatable tenders or inflatable kayaks. There are no call signs, etc. for those vessels.

4.3 Particulars of methods and scientific instruments:		
Types of samples and measurements	Methods to be used	Instruments to be used
Water surface samples: 2 x 1-liter samples will be collected at each location. For this entire expedition we anticipate a maximum of 19 sample locations which would equal collecting a total of 38 liters of surface water along the expedition track.	–Sample collection (water): Seawater will be taken as 1L surface grab samples either taken directly (submerging the sample container by hand) or decanted from a 5L metal or silicone bucket into reusable silicone sample bags. Two 1L samples will be taken at each sampling location. Depending on boat operations, there will be 1-2 sample locations each day. Note: if any organic matter (flora or fauna) is observed in the bucket or sample bag, that whole sample will be immediately returned to the sea and another taken. –Sample processing (water): The water samples will be filtered while onboard and transferred to a glass slide using a tape lift method. The filtered water will be used to wash the filtering equipment and sample bags.	A metal bucket and a 1-liter silicone sample bag or just a silicone sample bag.
Air samples: these will be taken at each location. The air pump will be set upon arrival and run until just before departure (from 30-180 minutes). We anticipate a maximum of 19 locations, therefore a maximum of 19 air samples along the expedition track.	–Sample collection (air): Air suspension samples will be taken using a small air pump (a Leland Legacy pump, the size of a small box of pasta) fixed onto a tripod on the ship (typically an upper deck, near the bow). –Sample processing (air): The same tape lift method will be used to transfer anything found in the air sample to glass slides.	Leland Legacy air pump that is set to collect 10 liters/minute positioned on a tripod at forward end of the Bridge Deck onboard the ship.
Sample processing and analysis: processing (filtering and tape lifting) as well as limited initial analysis will happen onboard the ship. Final analysis will happen off the ship post-expedition.	–Sample processing (water): The water samples will be filtered while onboard and transferred to a glass slide using a tape lift method. The filtered water will be used to wash the filtering equipment and sample bags. –Sample processing (air): The same tape lift method will be used to transfer anything found in the air sample to glass slides. –Sample analysis (all): Analysis of the slides will begin on the ship using a stereo, compound or polarizing light microscope to record morphological details of any fibers (type, color, shape, width, presence of delusterant and material (PLM only)) and fragments (type, color, dimensions) found in the samples. The analysis will be completed post-voyage. –QA/QC: Anti-contamination protocols will be in effect for all procedures. This includes wearing low-shed garments for sampling and during filtering, positioning the sample bucket/bags/air pump upwind of samplers, triple rinsing all equipment with filtered water, recording photos of sampling to capture a record of the gear worn by samplers, taking air blanks during filtering onboard the ship, taking samples of clothing and textiles in closest proximity to samples and recording/acknowledging contamination.	Ceramic filter holders and metal water bottles (our methods are designed specifically to be affordable and accessible so they can be replicated by the most community scientists), a compound, stereo and/or a polarizing light microscope.

4.4 Indicate nature and quantity of substances to be released into the marine environment:
No

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

4.6 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

4.7 Indicate whether protected species be studied. If yes, please specify:
No

4.8 Indicate whether scientific acoustic equipment will be used.:
No

4.9 Indicate whether fishing/trawling will be used.:
No

5. Installations and Equipment

5.1 Details of installations and equipment (including dates of laying, servicing, method and anticipated timeframe for recovery, locations and depth, and measurements):
No

6. Dates

6.1 Estimated overall project start and end dates:
Project Start Date: 6/25/2025
Project End Date: 7/9/2025

6.2 Coastal State-specific details:	
Coastal Area	Norway
Estimated Entry Date:	6/25/2025
Estimated Departure Date:	7/2/2025
Estimated Research Start Date:	6/25/2025
Estimated Research End Date:	7/2/2025
Explanation of multiple entries:	N/A
Research will be performed:	within 12 nm
Extent to which Norway will be enabled to participate or to be represented in the research project:	We will share all of our data with anyone from Norway who would like it and our report will acknowledge the work already being done in Norway. We are also in contact with one of Norway's most prolific and knowledgeable plastic pollution and microplastic researchers, Amy Lusher from The Norwegian Institute for Water Research, who is aware of and interested in our research.
Name, affiliation and contact information for all participants from Norway:	N/A
Coastal Area	Greenland
Estimated Entry Date:	7/3/2025
Estimated Departure Date:	7/5/2025
Estimated Research Start Date:	7/3/2025
Estimated Research End Date:	7/5/2025
Explanation of multiple entries:	N/A
Research will be performed:	within 12 nm
Extent to which Greenland will be enabled to participate or to be represented in the research project:	We will share all of our data with anyone from Greenland/Denmark who would like it and our report will acknowledge the work already being done by Greenland-based and Danish scientists.
Name, affiliation and contact information for all participants from Greenland:	N/A
Coastal Area	Iceland
Estimated Entry Date:	7/7/2025
Estimated Departure Date:	7/9/2025
Estimated Research Start Date:	7/7/2025
Estimated Research End Date:	7/9/2025
Explanation of multiple entries:	N/A
Research will be performed:	within 12 nm
Extent to which Iceland will be enabled to participate or to be represented in the research project:	We will share all of our data with anyone from Iceland who would like it and our report will acknowledge the work already being done by Icelandic scientists.
Name, affiliation and contact information for all participants from Iceland:	N/A

7. Port Calls

7.1 List of Port Calls
No Port Calls

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:
See Section 6.2
8.2 Proposed dates and ports for embarkation/disembarkation:
See Section 6.2

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:
No more than 3 months from the end date of the research as provided in Section 6.1.
9.2 Anticipated dates of submission to the coastal State of the final report:
No more than 2 years from the end date of the research as provided in Section 6.1.
9.3 Proposed means for access by coastal State to data (including format) and samples:
Data will be provided through official channels at no cost to the coastal State(s). Samples will be provided upon request.
9.4 Proposed means to provide coastal State with assessment of data, samples and research results:
Assessment of data, samples and research results will be provided at no cost to the coastal State(s).
9.5 Proposed means to provide assistance in assessment or interpretation of data, samples and research results:
Assistance in further assessment or interpretation will be provided upon request.
9.6 Proposed means of making results internationally available:
Our data will be made available upon request to the coastal state, local scientists, community members and any interested parties. Contact: rachael@rozaliaproject.org to obtain data, reports or papers from this expedition.

10. List of Supporting Documentation

10.1 List of attachments, such as additional forms required by the coastal State, etc.:			
Attachment Type	Description	Attachment	Submission Date
Proposed Cruise Track	This is the already determined cruise track for the National Geographic Resolution cruise. Sampling will occur at stops along the way. No additional locations are proposed for sampling.	Proposed Expedition Track SVIC 2025.pdf	1/21/2025 10:12 AM
Supplemental Material	This is the Notification of Proposed Research Cruise for Greenland/Denmark.	Proposed_Research_cruise_Greenl and_Miller 2025.pdf	1/21/2025 10:17 AM
Supplemental Material	This is the Notification of Proposed Research Cruise for Norway.	Proposed_Research_cruise_Norwa y_Miller 2025.pdf	1/21/2025 10:19 AM
Supplemental Material	This is the Notification of Proposed Research Cruise for Iceland.	Proposed_Research_cruise_Iceland _Miller 2025.pdf	1/21/2025 10:20 AM
Supplemental Material	The attached is a letter from the cruise/expedition company running the broader voyage regarding the acceptance of this project's specific science operations onboard. Since this is a tourism cruise, all arrangements have been made and the scientist will ride along.	LEX hosting letter Arctic 2025 - RMiller.pdf	1/22/2025 10:47 AM

Executed: 1/24/2025 3:10:40 PM (Coordinated Universal Time)



20 January 2025

Dear Rachael Miller,

We look forward to hosting you onboard our tourism vessel *M/V National Geographic Resolution* from 25 June through 09 July, 2025 as we travel from Svalbard to Jan Mayen to East Greenland to Iceland over the course of the voyage. As we take guests/passengers on our itinerary titled "Svalbard, Iceland and Greenland's East Coast", we will, when possible, support you to collect seawater to filter for microplastic fibers as part of your research project *Mapping Microplastics and Microfibers in Water and Air*.

As a part of this "Platform of Opportunity" we will supply you with a cabin and meals onboard, and (where applicable) seats on some private, group, LEX-arranged charter flights to arrive/depart port cities for embarkation/disembarkation to the vessel. We will endeavor to support you in collecting seawater for microplastics filtration, provided you have acquired the appropriate access, research, and sampling permits required by local authorities and other bodies as needed.

You are responsible for your own research permits, collection permits, sample transport permits and arrangements, as well as any large equipment transport (beyond what can be provided on charter flights).

Thank you,
Ashley Knight

Lindblad Expeditions
Science Operations Manager
ashleyk@expeditions.com

NOTIFICATION OF PROPOSED RESEARCH CRUISE

PART A: GENERAL

1. **NAME OF RESEARCH SHIP:** *National Geographic Resolution* **CRUISE NO.:**
RS152510-SVIC
2. **DATES OF CRUISE** From: 25 June 2025 To: 9 July 2025
3. **OPERATING AUTHORITY:** Lindblad Expeditions Holdings, Inc.

TELEPHONE: (212) 261-9000

TELEFAX:

TELEX:
4. **OWNER** (if different from no. 3): NA
5. **PARTICULARS OF SHIP:**

Name:	National Geographic Resolution
Nationality:	Registry: Bahamas
Overall length: (in metres)	124.4m
Maximum draught: (in metres)	5.3m
Net tonnage:	Gross tonnage 12,000
Propulsion e.g. diesel/steam:	Diesel-electric
Call sign:	IMO # 9880685
Registration port and number (if registered fishing vessel)	
6. **CREW**

Name of master:	Captain Martin Graser
Number of crew:	112
7. **SCIENTIFIC PERSONNEL**

Name and address of scientist in charge:

Rachael Z. Miller
PO Box 75
Granville, VT 05747

Tel/telex/fax no.: +1 802-578-6120

No. of scientists: 1

8. GEOGRAPHICAL AREA IN WHICH SHIP WILL OPERATE (with reference to latitude and longitude)

See below (#10) for full itinerary.

9. BRIEF DESCRIPTION OF PURPOSE OF CRUISE

In the big picture, this is not specifically a research cruise, this is a National Geographic-Lindblad Expeditions small vessel expedition ship open to paying passengers. Here is the link to the listing: <https://www.expeditions.com/expeditions/svalbard-iceland-greenlands-east-coast>

Rachael Miller is an invited Visiting Scientist joining the cruise in order to conduct citizen science research on microplastic and anthropogenic microfiber pollution in the air and surface water at already designated stops along the cruise track.

10. DATES AND NAMES OF INTENDED PORTS OF CALL

Overall: 25 June-9 July, 2025

Icelandic locations are highlighted.

DATE	PLACE	Lat/Long
25-Jun-25	LONGYEARBYEN, NORWAY	78.22°N 15.65°E
26-Jun-25	Lillehookbreen (cruising only)	79.3973°N 11.7292°E
	Signehamna	79.2723°N 11.5343°E
27-Jun-25	Texas Bar	79°36'02"N 12°52'07"E
	Monacobreen (cruising only)	79°23'54"N 12°36'24"E
	Moffen	80°00'N 14°30'E
28-Jun-25	Crozierpynten	79.919°N 16.840°E
	Alkefjellet - cruising only	79.5848°N 18.4608°E
29-Jun-25	Torellneset	79°21'49"N 20°44'06"E
	Sundneset	78°12,3'N 021°03,8'E
	Negribreen	78°34'48"N 19°02'18"E
30-Jun-25	Kapp Lee/Dolerittneset	78.1149°N, 20.8282°E
	Diskobukta	77.93°N 21.46°E
1-Jul-25	At Sea to Jan Mayen	
2-Jul-25	Båtvika, Jan Mayen	70.9169°N 8.7209°W
3-Jul-25	Rømer Fjord	70°30'N 25°00'W
4-Jul-25	Nansens Fjord - Exploring	68°18'N 29°53'W
5-Jul-25	Exploring	
6-Jul-25	At Sea - Crossing the Denmark Strait	
7-Jul-25	Isafjordur, Iceland	66°04'33"N 23°07'36"W
	Vigur, Iceland	66.055°N 22.828°W
8-Jul-25	Dyjandi	65°43'57"N 23°11'55"W
9-Jul-25	REYKJAVIK, ICELAND	64°08'45"N 21°56'33"W

Note: These are not exclusive nor are they necessarily the final destinations. Final destinations may change depending on the conditions (atmospheric, sea state and ice). Additionally, the Visiting Scientist has no influence over the intended (above) or the final destinations, those are determined by the Captain and Expedition Leader working within the ship's own operational permits.

11. ANY SPECIAL REQUIREMENTS AT PORTS OF CALL

None.

NOTIFICATION OF PROPOSED RESEARCH CRUISE

1.PART B: DETAILS

1. **NAME OF RESEARCH SHIP:** *National Geographic Resolution* **CRUISE NO.** RS152510-SVIC

2. **DATES OF CRUISE** From: 25 June 2025 To: 9 July 2025

3. a) **PURPOSE OF RESEARCH**

The primary objectives of our research are to:

-Investigate microplastic and anthropogenic microfiber in the air and surface waters throughout our voyage on the *NG Resolution* with National Geographic-Lindblad Expeditions, including the surface waters/air around Iceland, where we will be for approximately 4 days (weather-depending).

-Engage onboard guests and field staff as citizen scientists to complete the sampling, taking action to understand the problems our ocean faces and, in turn, be inspired to be part of the solutions.

-Further refine CSI for the Ocean's methods and equipment. This program was inspired by and uses forensic science methodology to utilize affordable equipment and accessible techniques so people of all ages can engage in meaningful and robust science that provides data that supports solutions to the problem of microplastic and anthropogenic microfiber pollution. Locations where these methods have been tested and deployed to date include the Hudson River in New York State, the Hawaiian Archipelago, Greenland, Arctic Svalbard, fjords of Norway, Faroe Islands, Iceland, Falkland Islands, South Georgia and Antarctica. Using the same methods in Norway and along the expedition route of the *NG Resolution* (Svalbard, Jan Mayen, Greenland and Iceland) will provide valuable information for this growing global database.

-Share the data from our sampling openly, making it accessible to community members, fellow scientists, and all stakeholders interested in microplastic and anthropogenic microfiber pollution.

-Use the data from Iceland and beyond to underpin the development and deployment of solutions to microplastic and particularly microfiber pollution. Our global dataset, as it grows, will have the power to build the will and momentum for solutions that range from inspiring innovation in textile design and manufacturing (alternative materials such as outerwear made from algae, for example) to supporting regulation and policies to installing proper filters on laundry machines - both washers and dryers - to educating consumers on clothing care habits that reduce microfiber production and extend the life of their clothing. These are solutions that will benefit Icelandic waters and beyond.

b) GENERAL OPERATIONAL METHODS (including full description of any fish gear, trawl type, mesh size, etc.)

The methods we use include the following:

–Sample collection (water): Seawater will be taken as 1L surface grab samples either taken directly (submerging the sample container by hand) or decanted from a 5L metal or silicone bucket into reusable silicone sample bags. Two 1L samples will be taken at each sampling location. Depending on boat operations, there will be 1-2 sample locations each day. Note: if any organic matter (flora or fauna) is observed in the bucket or sample bag, that whole sample will be immediately returned to the sea and another taken. Per our schedule, we anticipate a maximum of 8 locations will be sampled, with 2L of water taken per location for a maximum possible sample size of 16L of Icelandic waters.

–Sample processing (water): The water samples will be filtered while onboard and transferred to a glass slide using a tape lift method. The filtered water will be used to wash the filtering equipment and sample bags.

–Sample collection (air): Air suspension samples will be taken using a small air pump (a Leland Legacy pump, the size of a small box of pasta) fixed onto a tripod on the ship (typically an upper deck, near the bow).

–Sample processing (air): The same tape lift method will be used to transfer anything found in the air sample to glass slides.

–Sample analysis (all): Analysis of the slides will begin on the ship using a polarizing light microscope to record morphological details of any fibers (type, color, shape, width, presence of delusterant and material) and fragments (type, color, dimensions) found in the samples. The analysis will be completed post-voyage.

–QA/QC: Anti-contamination protocols will be in effect for all procedures. This includes wearing low-shed garments for sampling and during filtering, positioning the sample bucket/bags/air pump upwind of samplers, triple rinsing all equipment with filtered water, recording photos of sampling to capture a record of the gear worn by samplers, taking air blanks during filtering onboard the ship, taking samples of clothing and textiles in closest proximity to samples and recording/acknowledging

4. ATTACH CHART showing (on an appropriate scale) the geographical area of intended work, positions of intended stations, tracks of survey lines, positions of moored/seabed equipment, areas to be fished

See below.

a) TYPES OF SAMPLES REQUIRED (e.g., geological/water/plankton/fish/radionuclide)

5. 1. Air samples
2. Surface water samples (excluding biological matter)

b) METHODS OF OBTAINING SAMPLES (e.g., dredging/coring/drilling/fishing, etc. When using fishing gear, indicate fish stocks being worked, quantity of each species required, and quantity of fish to be retained on board).

1. Air samples to be collected using a small, battery powered air pump positioned on the bow of the ship.
2. Water samples to be collected using a small metal bucket with 1L samples decanted into silicone sample bags or sample collected by dipping sample bags directly into the water. If any flora or fauna are observed in the sample, the whole sample will be immediately returned to the ocean and another taken until the sample is free of biological data. At each sample location, we will collect 2 x 1L water samples.

6. DETAILS OF MOORED EQUIPMENT

<u>Dates</u> <u>Laying</u>	<u>Recovery</u>	<u>Description</u>	<u>Depth</u>	<u>Latitude</u>	<u>Longitude</u>
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Not Applicable

7. ANY HAZARDOUS MATERIALS (chemicals/explosives/gases/radioactives, etc.)
(Use separate sheet if necessary)

Not Applicable - no hazardous materials will be used.

a) Type and trade name

b) Chemical content (and formula)

c) IMO IMDG code (reference and UN no.)

d) Quantity and method of storage on board

e) If explosives give dates of detonation

- Method of detonation
- Position of detonation
- Position of detonation
- Frequency of detonation
- Depth of detonation
- Size of explosive charge in kg.

8. DETAIL AND REFERENCE OF

a) Any relevant previous/future cruises

The same research has been conducted from the same National Geographic-Lindblad Expeditions vessel and her sister ship, the *National Geographic Endurance*, under the same Visiting Scientist program on five previous cruises. They include “Arctic Svalbard and the Fjords of Norway” in June 2023, “Falklands, South Georgia and Antarctica” in November 2023, “Coastal Wonders of Norway, Shetlands, Faroes and Iceland” in June/July 2024 and two of the “Voyage to Antarctica” in December 2024. Additionally, this same research has been conducted in the Hudson River, USA (the entire river) and in the Hawaiian Archipelago by the same scientist and originator of the program, Rachael Miller.

For the 2024 Arctic cruise that included operations in Icelandic waters, we were granted consent to collect samples as part of the same program (Ministry of Foreign Affairs reference# UTN24030541/ Note Verbale No. 14-2024).

b) Any previously published research data relating to the proposed cruise

Rachael Miller and her team have published several peer-reviewed papers on the topic of microplastic and anthropogenic microfiber pollution including those based on field work, establishing the effect dryers have on microfiber pollution and establishing best practices to reduce procedural contamination in the field and lab while conducting this type of research. Those papers include:

Miller et al., Mountains to the Sea: River study of plastic and non-plastic microfiber pollution in the northeast USA, *Marine Pollution Bulletin*, 2017: <https://www.sciencedirect.com/science/article/abs/pii/S0025326X17306094>

Gwinnett and Miller, Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles, *Marine Pollution Bulletin*, 2021: <https://doi.org/10.1016/j.marpolbul.2021.113095>

Kapp and Miller, Electric Clothes Dryers: An underestimated source of microfiber pollution, *PLOS One*, Oct. 7, 2020: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239165> (open access)

Miller et al., Microplastic and anthropogenic microfiber pollution in the surface waters of the East River and Long Island Sound, USA, *Regional Studies in Marine Science*, Feb. 2024: <https://www.sciencedirect.com/science/article/abs/pii/S2352485523005509>

Additionally, our team created StoryMaps of each expedition detailing and explaining both the results and how those results suggest specific actions. Find all of the Storymaps at: <https://www.rozaliaproject.org/csi-for-the-ocean>

The two that are specific to the Arctic are:

bit.ly/CSIfortheOceanArctic2023

<https://bit.ly/CSIfortheOceanSubarctic2024>

9. NAMES AND ADDRESSES OF SCIENTISTS OF THE COASTAL STATE(S) IN WHOSE WATERS THE PROPOSED CRUISE TAKES PLACE WITH WHOM PREVIOUS CONTACT HAS BEEN MADE

NA

10. STATE

a) Whether visits to the ship in port by scientists of the coastal state concerned will be acceptable (Yes/No)
No

b) Participation of an observer from the coastal state for any part of the cruise together with the dates and the ports for embarkation and disembarkation
No

c) When research data from the intended cruise are likely to be made available to the coastal state and by what means

Our data will be made available upon request to the coastal state, local scientists, community members and any interested parties. Contact: rachael@rozaliaproject.org to obtain data, reports or papers from this expedition.

PART C. SCIENTIFIC EQUIPMENT

Complete the following table
using a separate page for
each coastal state

Coastal state: Iceland

Port of call: See Draft Itinerary (Part A, #10 above)

Dates: Overall: 25 June-9 July, 2025
Iceland: 7-9 July 2025 (conditions-dependent)

Indicate "YES" or "NO"

				DISTANCE FROM COAST		
<u>List scientific work by function</u> e.g.	Water column including sediment sampling of the seabed	Fisheries research within fishing limits	Research concerning the natural resources of the conti- nental shelf or its physical characteris- tics	Within 3 nm	Between 3-12 nm	Between 12-200 nm
Magnetometry	No	No	No	No	No	No
Gravity	No	No	No	No	No	No
Diving	No	No	No	No	No	No
Seismics	No	No	No	No	No	No
Seabed sampling	No	No	No	No	No	No
Bathymetry	No	No	No	No	No	No
Trawling	No	No	No	No	No	No
Echo sounding	No	No	No	No	No	No
Water sampling	Yes	No	No	Yes	No	No
U/W TV	No	No	No	No	No	No
Moored instr.	No	No	No	No	No	No
Towed instr.	No	No	No	No	No	No



(On behalf of the Principal Scientist)

Dated: 22 January 2025

NB IF ANY DETAILS ARE MATERIALLY CHANGED REGARDING DATES/AREA OF OPERATION
AFTER THIS FORM HAS BEEN SUBMITTED, THE COASTAL STATE AUTHORITIES MUST BE
NOTIFIED IMMEDIATELY

Proposed expedition track (per <https://www.expeditions.com/expeditions/svalbard-iceland-greenlands-east-coast>):



Proposed expedition track (per <https://www.expeditions.com/expeditions/svalbard-iceland-greenlands-east-coast>):

Along with the Draft Itinerary (included in the application), this is what is provided by National Geographic-Lindblad Expeditions for this cruise. As a Visiting Scientist, I will sample in locations only at stopping places along the route. There will not be any special locations or locations off the cruise track for my research nor will the ship make any special stops for sampling.

