

## Quark Expeditions Canadian Arctic 2022

# Project Description

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## 1 Project Description

The Quark Canadian Arctic 2022 Expedition will operate with the *m/v Ultramarine*. The *m/v Ultramarine* carries a maximum of 199 passengers and a minimum of 32 staff, for a staff to passenger ratio of 1:6.2. Every voyage will have an ornithologist, a marine biologist, and a doctor, as part of the expedition staff. Many of our team have 20+ years, or more, experience working in the Canadian Arctic and other sensitive wildlife areas.

Passengers use the ship as a floating platform to enjoy the scenery of the area. Once or twice per day, the passengers may disembark the ship by Zodiacs to go ashore in wilderness areas or communities. Alternatively, they may join a Zodiac cruise, helicopter sightseeing flight, or participate in a kayaking activity.

All Zodiacs are equipped with emergency/safety kits and operate in pairs. If there is a plan to go ashore, a landing barrel full of emergency supplies is placed at the landing site. At least 1 of the paired Zodiacs has a firearm handler, who has completed all modules and levels of our internal accreditation courses. All staff, including the Zodiac drivers, have VHF radios to stay in contact with each other as well as the ship. If a bear is seen, however, nobody will go ashore.

When cruising bird cliffs, Zodiac drivers follow AECO guidelines, CWS Guidelines for Seabird Viewing by Cruise Ships and CWS Guidelines for Visiting Seabird Colonies in Canada.

To prepare passengers for landings, printed AECO Guidelines are mailed to the passengers to read before leaving home. Quark staff also review these guidelines with passengers on the ship before our first landing. Finally, before each landing or Zodiac cruise, we hold two briefings, one on the ship and one either on shore or in the Zodiacs to explain the limits of the area and the guidelines for visiting a specific area, for example being quiet around bird cliffs.

If marine mammals are encountered by the ship or by Zodiac, we follow the IAATO Marine Wildlife Watching Guidelines For Vessel & Zodiac Operations. Quark is an American company, and we follow the US Marine Mammal Protection Act. Additionally, we follow the guideline document; NOAA Whale Watching and Viewing Other Marine Mammals in Alaska.

## 2 About Quark

For more than 30 years, Quark Expeditions has been the leading provider of polar adventure travel. With its diverse fleet of specially equipped vessels and seasoned expedition leaders, they offer travelers unparalleled access to the most remote regions on earth: the Arctic and Antarctica.

Quark's voyages will venture through the heart of Nunavut to experience the Canadian Arctic at its best. Aboard an ice-strengthened ship, this expedition will show passengers not only the natural beauty of the region, but also teach them about the rich history and culture that still exists today.

Quark Expeditions is a member of the Association of Arctic Expedition Cruise Operators (AECO) <http://www.aeco.no> and the International Association of Antarctica Tour Operators (IAATO) <http://www.iaato.org>. Both organisations have strict guidelines and advocate for safe and environmentally, socially and economically responsible and sustainable tourism

## 2.1 Health and Safety

In addition to the ice-worthiness of our ships, seasoned captains, expedition teams and crew, Quark's safety standards, training, and equipment protocols are of utmost importance and, in many cases, set the standard for the industry. Quark is the only expedition cruise company awarded [British Standard BS 8848](#), externally recognizing and accrediting Quark's health & safety management system. Under BS 8848, Quark's safety management system is independently verified annually.

We have one of the highest staff to passenger ratios 1:6.2 on *m/v Ultramarine*. Every ship has a doctor onboard who is directly hired by Quark for their international, wilderness and expedition medical experience.

All Quark expedition staff members complete our internal accreditation program, which includes training on board a vessel. The on-board training builds on the written curriculum and takes staff through both theoretical and practical instruction and assessment. The program covers risk & safety management, radio theory and function, small vessel operations, expedition navigation, and polar bear behavior & safety. Our expedition staff members are also certified in CPR & life-saving skills and have passed the IAATO Field Staff Assessment and/or AECO test.

Quark's comprehensive Incident Management Plan is tested regularly. Our lifeboat and life-raft capacity exceed SOLAS requirements such that there is always at least 25% additional capacity than the number of people onboard. Quark Expeditions does not use vessels with open lifeboats. Also exceeding SOLAS requirements is Quark's policy of providing immersion suits for all passengers

## 2.2 Environmental Sustainability

Quark Expeditions is profoundly committed to environmentally responsible tourism. Protecting the places we visit is necessary to ensure we can continue to introduce travelers to the spectacular beauty of the polar wilderness. Through Polar Promise, our comprehensive sustainability strategy framework, we've incorporated existing sustainability initiatives into a cohesive plan so we can identify where we can do better or do more.

- Our vessels burn Marine Gas Oil (MGO), a clean burning fuel with a low emission factor
- Quark conforms to all international regulations/policies governing disposal of waste at sea
- We serve only sustainable seafood
- We use eco-friendly laundry chemicals & cabin amenities
- We provide every passenger with a reusable water bottle
- We provide plastic straws and napkins only on request
- We limit paper use on board, and use only recycled, acid-free paper
- We use recycled paper and acid free inks in the manufacture of our brochures

Quark has been a proud ambassador of the Polar Regions since 1991. Thanks to our passengers, Quark's onboard auctions have raised an average of \$300,000 each year for charities dedicated to sustainability and conservation in the places we visit.

## 2.3 Cultural Sustainability

Quark embraces the World Tourism Organisation guidelines; "Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-

cultural understanding and tolerance. Ensure viable, long-term economic operations, providing benefits to all stakeholders that are fairly distributed including stable employment and income-earning opportunities. (....)."

Educating and respecting cultural sensitivity and supporting local communities is something we strongly believe in. The northern native peoples have had an integral relationship with the polar environment for thousands of years and may still have a dynamic and influential role in the balance of many ecosystems. Tourism that directly or indirectly affects this natural balance should be considered as affecting the environment. "Therefore, it is essential, when discussing concerns with the Arctic environment, that the physical presence and cultural beliefs of these people are considered" (Robin Buzzza, 1994).

Quark is also obligated to comply with our own AECO industry set of cultural guidelines and code of conduct, and with permitting obligations from the Department of Culture and Heritage, Government of Nunavut.

### **3 Environmental Impact**

#### **3.1 Ship Operations**

Ship operations include all activities on board the vessel while underway. Each individual voyage will have a limited residency time while en route to its destination, while at anchor at specific sites, and upon departure. Tour routes are chosen to provide scenic and educational opportunities while minimizing impacts to the environment.

Potential impacts to the air, water quality, and marine fauna and flora from shipboard operations include: fuel spills; waste disposal, including sewage disposal; marine incidents and accidents; inadvertent entering of protected areas; point source air pollution; ballast water; and breaking ice. There is also a potential of impacts to benthic communities by anchoring operations.

##### **3.1.1 Fuel Spills**

While fuel spills are the most unpredictable accident on board ship, their occurrence can be minimized through exercising several practices. Ships will fuel at their home port location. No fueling operations, except for Zodiac outboard engines and helicopters, will occur in the Canadian Arctic. Regardless, potential fuel releases can result from physical damage to the fuel containing equipment, accidental release, bilge water discharges and waste disposal. The severity of the impact is a function of the type and quantity of fuel. No fuel will be purposely discharged from the vessel while at sea. All of our ships will carry fuel spill kits in accordance with SOPEP (Shipboard Oil Pollution Emergency Plan) as set out in regulations of MARPOL 73/78.

##### **3.1.2 Waste Disposal**

Waste materials, including refuse, sewage waste, and waste mechanical fluids will be generated while the ship operates in the Canadian Arctic. Adherence to international standards will avoid waste release incidents.

Quark undertakes to return all refuse and waste generated during small boat activities, adventure activities conducted ashore, and from Zodiacs, helicopters, and kayaks to the vessels for correct disposal.

### 3.1.3 Marine Incidents and Accidents

The unlikely event of marine collision or accidental discharge of fuel and waste products in the Canadian Arctic does exist. Impacts to the environment would include the accidental release of fuel and incidental discharge of refuse. Our vessels carry marine gas oil (MGO) as bunker in addition to smaller quantities of lubricating fluids, oils, and unleaded gasoline.

### 3.1.4 Air Pollution

Stack emissions from the vessel into the atmosphere are insignificant and are unlikely to cause any kind of direct or indirect impact. Burning diesel fuel the ship will produce normal amounts of hydrocarbon, heat and traces of chemical emissions. The emissions will be a function of the types and quantity of fuel burned, and potential smoke emissions from the incinerator.

### 3.1.5 Breaking Ice

Our vessels will periodically break ice. No coastal fast ice and only a very small fraction of the pack ice in the region will be affected. While this may affect itineraries, any "breaking" of ice by our vessels on physical, chemical, and biological processes will be insignificant. The ice is already well on its way to dispersion through the natural annual stage of breaking up and melting.

### 3.1.6 Impacts on Fauna and Flora

Impacts to marine animals can result from habitat disruption through the vessel's presence, water turbulence from the vessel's operation, pollution from inadvertent ship discharges and the ship's exhaust and, although unlikely, a direct strike from the vessel. Navigating through and breaking sea ice could result in harmful interference of marine animals.

Impacts to benthic marine flora and fauna are possible from anchoring. At the present time there is insufficient survey of benthic communities in the Canadian Arctic to determine whether there are likely to be significant effects from tourist activities. Anchoring will not occur in regions where special benthic communities have been recognized.

## 3.2 Small Boat Operations

These operations include all activities using Zodiacs or kayaks for cruising and provide excursions and landings on offshore islands and the mainland. Excursion itineraries will be prepared, establishing a tour that provides scenic and educational opportunities while minimizing impacts to the environment. Each individual small boat operation will have a limited residency time while en route to its landing destination, while ashore, and upon departure.

Potential impacts from Zodiac operations include: fuel spills; waste disposal; and marine incidents and accidents; all small boat operations can also potentially disturb near shore fauna and flora.

### 3.2.1 Fuel Spills

Zodiac touring has the potential for minor fuel spills that could affect pack ice or shoreline communities. Fuel spills can result from physical damage or overturned craft, accidental release, and damage to fuel containing equipment. Refilling of tanks is completed in safe conditions on board the vessels. Each Zodiac carries a limited

amount of unleaded petrol. At most, two industry-approved, thick plastic, 20-liter containers of this mixture are carried. No fuel will be purposely discharged from the small boat while at sea. Due to limited amounts of MARPOL-recommended fuel carried, adherence to Standard Operating Procedures, and natural dispersions by wind and wave action, these impacts will be no more than minor or transitory.

### 3.2.2 Waste Disposal

All refuse or waste generated during small boat activities will be returned to the ship for disposal in accordance with MARPOL. Engine cooling wastewater from the boat's outboard engine will be discharged directly into the seawater. This cooling water will discharge normal amounts of petroleum hydrocarbons, which are naturally dispersed by wind and wave action, and are not expected to have a significant impact on the environment. No waste mechanical fluids will be disposed of while the boat is on an excursion or during a landing. Impacts from waste disposal will be no more than minor or transitory.

It is important to note that with increasing world attention on global warming and on human produced pollutants, companies that manufacture machinery such as outboard motors, have made significant progress over the last five years in manufacturing engines that are more efficient and less polluting.

### 3.2.3 Marine Incidents and Accidents

The unlikely event of marine collision or accidental discharge of fuel and waste products in the Canadian Arctic does exist. Impacts to the environment would include the accidental release of a mixture of unleaded petrol and two-stroke oil, and incidental discharge of refuse. Due to limited amounts of MARPOL recommended fuel carried, and adherence to Standard Operating Procedures, these impacts will be no more than minor or transitory.

### 3.2.4 Disturbance of Fauna and Flora

Small boat operations have the potential to directly disturb near shore fauna and flora. Impacts to marine animals can result from habitat disruption through the boat's presence, noise from the tour operations and activities, water turbulence from the boat's operation, pollution from inadvertent engine discharges and exhaust, and, although unlikely, a direct strike from the vessel. Improper navigation and speed could result in harmful interference of marine animals or sea birds in the water, on ice floes, or in near shore environments. These unintentional contacts can cause physical damage to animal life and can also cause physical damage to the sea floor and shoreline.

## 3.3 Helicopter Operations

Helicopter operations refer to all activities carried out using helicopters. In the Canadian Arctic, this includes only sightseeing flights. Flight plans are prepared ahead of time, establishing an activity that provides scenic and educational opportunities while minimizing impacts to the environment.

Potential impacts from helicopter operations include fuel spills, emergency incidents, and disturbance of fauna and flora.

### 3.3.1 Fuel Spills

Helicopter refueling has the potential to cause fuel spills. Fuel spills can result from accidental release, and damage to fuel containing equipment. Refueling takes place onboard according to the procedures outlined in Quark Expeditions' Helicopter Standard Operating Procedures. No fuel will be purposely discharged from the helicopter while under operation. Due to the strict adherence to Standard Operating Procedures and natural dispersions by wind and wave action, these impacts will be no more than minor or transitory.

### 3.3.2 Emergency Incidents

The very unlikely event of an emergency incident or accidental discharge of fuel and waste products in the Canadian Arctic does exist. Impacts to the environment would include the accidental release of aviation fuel and incidental discharge of refuse.

Quark Expeditions Helicopter Standard Operating Procedures were developed under the UK CAA guidelines for CAT (commercial air transport) with EASA.TCO.GBR-0039.01 (Compliance Authorization). Strict adherence to standard operating procedures minimizes the risk of a crash or accidental discharge of fuel.

### 3.3.3 Disturbance of Fauna and Flora

Helicopters have the potential to directly disturb fauna and flora. The noise created by sightseeing flights also has the potential to disturb marine animals, concentrations of birds and other wildlife.

Flight path planning will be undertaken by the pilots, the Expedition Leader and the ship's Captain. The pilots will make the final decision about flight paths during the flight, considering the proximity of wildlife and any possible disturbances. Pilots and Expedition team follow AECO wildlife guidelines and consider all pertinent guidelines to avoid disturbing wildlife and their habitat.

Helicopters are under no circumstances allowed to fly over any wildlife concentration and will not fly at altitudes lower than 610 meters laterally to each side of any such concentrations. These are the minimum distances, and even more latitude will be given to flora and fauna in the area.

The Aircraft used by Quark is the Airbus H 145, which is the industry-best helicopter in both fuel emissions and noise pollution. Compared to similar aircraft the H 145 produces 30% fewer emissions and 20% less perceived sound. The use of this aircraft further reduces the likelihood of impact on Arctic wildlife, as compared to competing helicopters.

## 3.4 Landing and Shore Operations

Landings and shore operations will occur during small boat excursions. Impacts are possible to flora and fauna, historic buildings, geologic and other features, and scientific studies. Damage can result from small boat landings, pedestrian traffic through buildings and natural features, and within plant or animal communities. Alien species and diseases could be accidentally introduced to the Canadian Arctic environment or translocated between sites, protected areas could be inadvertently entered, and rescue operations may have impacts on the Canadian Arctic environment.

#### 3.4.1 Impacts on Fauna and Flora

Landings, shore operations, and tourist activities have the potential to impact bird colonies, seal colonies, and other fauna and flora, including rare and endangered species. Direct impacts can result in habitat disruption, impacting nesting birds, seals and other animals present in the area. Tourists can cause physical damage and harm, such as trampling nesting sites and fragile plant communities. Noise impacts from Zodiacs and tourists can disrupt the activities of the shore animals. Impacts could also include predation and scavenging of eggs and chicks if adults are forced to leave their nests or leave their young unattended.

#### 3.4.2 Impacts on Other Features

Other potential impacts include impacts to terrestrial resources, geologic features, aquatic and aesthetic environments. Tour visits can result in the degradation of historic buildings and artifacts through abrasion, increased humidity, physical defacement, and removal of objects. Repeated passage by pedestrians may create a situation for soil erosion in some areas, depending on the terrain. Physical contact, both by landing craft and by visitors traversing through the area, can disrupt and damage the natural processes of the environment. Littering and waste disposal can cause further impacts. All refuse or waste generated during shore operations will be returned to the ship for proper disposal in accordance with MARPOL. Scientific research studies, historic and culturally significant sites may be disturbed or disrupted by tourist activities.

#### 3.4.3 Introduction of Alien Species and Diseases

The physical presence of tourists in conjunction with small boat landings could result in the accidental introduction of alien species or microorganisms. Introduction of alien species, soils, or microbes could result in significant impacts on the local biota.

#### 3.4.4 Rescue Operations

Safety is a matter also directly linked to environmental damage, especially if there is need for a major response to an emergency. This may involve rescue operations close to breeding sites for seabirds and other wildlife. It may also mean disturbance in the course of sheltering and rescuing people who could be stranded ashore for some time. And there is a potential of pollution from human wastes and used survival equipment.

#### 3.4.5 Cumulative Impacts

Cumulative impact is the impact of combined past, present and reasonably foreseeable activities. These activities occur over time and space. Repeated visits by ship-based tourists, coupled with other human activities, could have cumulative impacts on the landscape, fauna, flora, historical artifacts, and science programs and support activities in the areas visited. The nature and severity of these possible cumulative effects may differ from site to site depending on the characteristics of the sites and variables such as the frequency of visits. Consideration to cumulative impacts and all the aforementioned aspects has been given.



## 4 Environmental Impact Mitigation

### 4.1 Ship Operations

Depending on general conditions, members of ship's crew may occasionally be allowed ashore by the Expedition Leader. Crew will receive the same level of briefing and supervision as passengers, especially considering possible poor knowledge of English and a lack of traditional environmental care. At the beginning of every season, and prior to landings, a mandatory briefing for crew about environmental and conservation matters will be scheduled with the Chief Officer.

Environmental Information and Guidelines summarizing key obligations in relation to waste disposal, marine pollution and avoidance of harmful interference with fauna and flora will be provided to the Captain and his Officers. The Expedition Leader will give a translated talk to the crew on their obligations prior to the first landing.

The following documents are available on board for officer, crew and expedition staff reference:

- MARPOL - International Convention for the Prevention of Pollution from Ships.
  - SOLAS - International Agreement Concerning Safety of Life At Sea.
  - Marine Mammal Protection Act.
  - All Canadian Arctic Permits
  - Handbook for Expedition Staff Members and Expedition Leaders
  - AECO Operator Guidelines
  - List of adopted Site Guidelines
- 
- Quark Expeditions IEEs

On board routines to prevent environmental pollution incidents will include the following:

- Safe and careful navigation by experienced captains and officers with the latest navigational technology onboard. Updated naval charts for all areas visited will be used.
- A high standard of maintenance for the vessel itself, and all equipment on board, including Zodiacs, outboard engines, radio communication and emergency supplies.
- Correct storage and disposal of waste products to ensure there is no accidental discharge.
- Contingency plans and oil spill equipment (spill cleanup kits) according to MARPOL and Treaty regulations in place to deal with accidental fuel discharges by the vessel.
- Refilling of tanks for Zodiac outboard engines completed according to SOP's to avoid spillage or discharge of any accidentally spilt fuel into the surrounding water.
- Careful instruction of crew and staff of possible hazards which could occur and the necessary immediate measures to be taken in any given situation to avoid pollution of the environment.
- All our vessels have enclosed or partially enclosed lifeboats and there are enough immersion suits available for all crew, staff and passengers.

#### 4.1.1 Oil and Oily Mixtures

The likelihood of marine pollution is reduced by the use of polar capable ships and crew, by cautious operational practices, and by the fact that, aside from their own fuel supply, vessels are usually not carrying noxious substances as a scientific or logistic support vessel might. As required by the NSF's regulations at 45 CFR Part 673, the vessel carries an approved Shipboard Oil Pollution Emergency Plan (SOPEP) which is closely adhered to. Oily mixtures will be stored in the vessel's holding tanks. There is no discharge of any water or waste containing oil from these tanks in the Canadian Arctic waters. Oily wastes and mixtures, and any possible noxious liquids, will be retained on board and returned with the vessel for correct disposal in port. Oil spill contingency response equipment is carried on board, and officers and crew are trained in emergency response procedures.

#### 4.1.2 Garbage

Quark Expeditions and the Captain, Officers and crew will ensure that MARPOL requirements and guidelines are met. On board incineration of waste is an approved garbage treatment process under MARPOL and MEPC 59(33) and incorporates specifications for shipboard incinerators. The incinerators on our vessels are designed, constructed, operated and maintained in accordance with this standard. Dry garbage is to be incinerated.

#### 4.1.3 Sewage

Our vessels comply with MARPOL requirement for sewage treatment. All sewage, gray water and kitchen sink water is stored in tanks until it can be processed. The treatment plant chlorinates and flocculates sewage, separating solids and liquids. Sewage sludge is drawn from the sewage treatment plant and incinerated.

#### 4.1.4 Ballast

Quark will ensure that the ship's crew are aware of and comply with international guidelines for preventing the introduction of unwanted aquatic organisms and pathogens from ship's ballast water and sediment discharges.

#### 4.1.5 Pollutants

The use of MARPOL recommended fuels for ship and small boat operations will help to minimize pollutants discharged to the environment. Accidental releases or discharges that do occur will be minimized by adherence to Quark's Standard Operating Procedures and will be mitigated by clean-up efforts and through the natural dispersion that results from wind and wave action.

#### 4.1.6 Disturbance of Marine Wildlife

At points of disembarkation the vessel will ordinarily not approach or anchor closer than a respectful distance to ensure minimal disturbance at a landing site.

In open water or in pack ice, the vessel may encounter marine mammals and seabirds. Efforts are made to minimize disturbances to animal communities through avoidance and low-impact ship operations by maintaining slow speeds and respectful distances while in the presence of animal communities. The vessels will be operated in strict compliance with NOAA Whale Watching and Viewing Other Marine Mammals in Alaska, IAATO Marine Wildlife Watching Guidelines (Whales & Dolphins, Seals and Seabirds) For Vessel & Zodiac Operations, AECO guidelines, CWS Guidelines for Seabird Viewing by Cruise Ships and CWS Guidelines for Visiting Seabird Colonies in Canada to ensure that animal individuals and communities are not disturbed.

#### 4.1.7 Summary

Vessel operations will be carried out in accordance with SOLAS; the ISM Code; applicable domestic statutes and regulations, including the Marine Mammal Protection Act, and the Endangered Species Act; QEI's Ship Operations Environmental Guidelines (Appendix 10.12), and IAATO Marine Wildlife Watching Guidelines. No protected areas will be entered without permits or permissions. The Captain, officers and crew will ensure strict compliance with all MARPOL regulations. Emergency equipment will be in place to deal with accidental fuel discharges. The ship's operation is expected to have no more than minor or transitory impacts on the flora, fauna, and other components of the Canadian Arctic environment.

#### 4.2 Small Boat Operations

Small boat operations have the potential to directly impact fauna and flora. Mitigation measures include the implementation of Standard Operating Procedures and strict compliance with guidelines codes of conduct regulations and permitting restrictions to ensure a no more than minor or transitory impact on the Arctic plant and animal life. All activities will be conducted in accordance with the Marine Mammal Protection Act which states: "Do not use aircraft, vessels, small boats or other means of transport in ways that disturb wildlife, either at sea or on land". Zodiac drivers and kayakers will be briefed on appropriate behavior around wildlife. All Zodiac drivers must also pass an internal theoretical and practical accreditation test regarding Zodiac operations in the Polar Regions. All equipment used during small boat operations will be returned to the vessel.

It is unlikely that Zodiac or kayak use will have more than a minor or transitory impact on the Canadian Arctic environment based on strict operational adherence to Standard Operating Procedures (SOP's) and compliance with all guidelines, codes of conduct, regulations and permitting restrictions.

#### 4.3 Helicopter Operations

Helicopter operations have the potential to directly impact fauna and flora. Mitigation measures include the implementation of Standard Operating Procedures and strict compliance with permitting restrictions and relevant AECO guidelines. Compliance with these regulations ensures a no more than minor or transitory impact on the Arctic plant and animal life. As with ship and small boat activities, helicopter operations will be conducted in accordance with the Marine Mammal Protection Act.

It is unlikely that Helicopter sightseeing flights use will have more than a minor or transitory impact on the Canadian Arctic environment based on strict operational adherence to Standard Operating Procedures (SOP's) and compliance with all guidelines, codes of conduct, regulations and permitting restrictions.

#### 4.4 Landing and Shore Operations

The primary method of ensuring that any impacts are no more than minor or transitory is through avoidance and management of visits. Our landing policy aims to reduce the likelihood of impacts by disembarking passengers with an acceptable staff to passenger ratio of no more than 1:20, to specific localities for specified times. Strict supervision ensures minimum approach standards for wildlife. Vegetation and vulnerable ice-free ground are not traversed, and no materials are removed or introduced. The expedition staff establishes boundaries where passengers can and can't walk reducing the potential for significant impact. Passengers will not dispose of any litter or garbage. Smoking is prohibited.

Every respect and consideration will be shown to wildlife to avoid interference or disturbance. Reasonable distances will be kept at all times and close observation of any reaction of wildlife will be made. Passengers who disregard the rules will be warned and in a serious breach of regulations will be removed from the site by the EL and denied any further landings during the voyage.

Passengers are asked to clean their boots before and after each landing to prevent the possible introduction of foreign materials to the Canadian Arctic and the potential of translocation between sites. Observance of Guidelines for Boot and Clothing Decontamination will reduce the likelihood of these effects. There will be boot washing basins and brushes near the Zodiac gangways. Zodiacs and kayaks will be cleaned before and after landings.

#### 4.4.1 Safety during Landings

Ensuring the safety of passengers, staff and crew during landings will always have highest priority. Poorly organized landing operations could result in both risks to human life and environmental damage. Comprehensive safety and contingency plans will be in place, and emergency response will be constantly trained.

#### 4.4.2 Historic Sites and Archaeological Sites

Passengers will be thoroughly briefed on the significance of historic sites and monuments. Prior to indoor visits to historic sites they are required to clean their boots and remove any clothing wet by seawater, in order to avoid floor abrasion and corrosion of metal objects. They are advised not to wear any backpacks, not to handle or remove any items, and not to disturb historic artifacts often located around these sites. Smoking is strictly forbidden on all shore excursions and therefore is not a factor when visiting historic sites or huts. Specific guidelines regarding these visits will be given to passengers prior to landings and are strictly enforced. Visitor numbers around and inside historic sites are limited to avoid impacts by congestion.

#### 4.5 Cumulative Impacts

A range of measures can be taken to avoid, minimize, or mitigate the possible cumulative impacts of ship-based tour operations. These measures include limiting the number of visits and visitors to particular sites; maximizing, minimizing, or alternating the number of sites visited; developing site specific visit guidelines for different types of sites; establishing qualification standards for ship operations and expedition staff; conducting comparative studies and perturbation experiments; instituting site modifications such as marking walking paths; encouraging self-regulation and self-policing; and establishing and periodically reviewing guidelines or codes of conduct for activities not already covered by existing protocols (taken from Assessment of Possible Cumulative Environmental Impacts of Commercial Ship-Based Tourism in the Antarctic Peninsula Area, June 7-9, 2000 workshop of IAATO jointly hosted with the U.S. Environmental Protection Agency and the U.S NSF).

We especially support the following minimization and mitigation measures:

- Developing and introducing site-specific guidelines for different types of visitor sites.
- Monitoring programs on visitor sites to detect possible long-term cumulative impacts.
- Avoidance of sites showing specific high sensitivity to potential environmental damage.
- The use of the Post Visit Site Report forms, and the formation of databases.

## 5 Fuels to be used

The m/v *Ultramarine* uses Marine Gas Oil (MGO), a clean burning fuel with a low emission factor. Zodiacs use unleaded petrol and helicopters use Jet A1 aviation fuel.

## 6 Transportation

Passengers use the m/v *Ultramarine* as a floating platform to enjoy the scenery of the area. Once or twice per day, the passengers may disembark the ship by Zodiacs to go ashore in wilderness areas or communities. Alternatively, they may join a Zodiac cruise, helicopter sightseeing flight, or participate in a kayaking activity.

## 7 Schedule of Activities

Please see the attached preliminary itinerary for the m/v *Ultramarine* voyages that travel to the Canadian Arctic.