



The Quark Canadian Arctic 2016 Expedition

CWS Project Description

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Quark Expeditions

For 25 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 small, ice-strengthened ships, these expeditions 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.

Health & 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 1:9 on Sea Adventurer & Kapitan Khlebnikov
- Every ship has two doctors onboard, one of whom is directly hired by Quark for their international, wilderness and expedition medical experience
- Our Expedition staff members are certified in CPR & life-saving skills
- All Expedition staff have passed the IAATO Field Staff Assessment or AECO test and participate in Quark's unique internal training and accreditation scheme – all staff must pass practical and theoretical modules covering Zodiac operation, operating in polar bear country, VHF radio operation, navigation and firearm handling and management.
- Quark's comprehensive Incident Management Plan is tested regularly
- Our lifeboat and life-raft capacity exceeds 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

Sustainability – Environment

Quark Expeditions is profoundly committed to environmentally responsible tourism.

- We were the first operator to offer inclusive CarbonNeutral® voyages on the Ocean Diamond



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- Quark's flights on the Antarctic Express Fly-Cruise program are carbon offset and help the conservation of 38,000 hectares of native forest in the Magallanes region of Chile
- All Quark team air travel is carbon offset
- 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 use only recycled, acid-free paper onboard and limit paper use
- 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 \$150,000 to \$200,000 each season for charities dedicated to sustainability and conservation in the places we visit.

Sustainability – Culture

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 Buzza, 1994).

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

Activity Description

The Quark Canadian Arctic 2016 Expedition will operate with the MV Sea Adventurer & IB Kapitan Khlebnikov, carrying a maximum of 117 passengers and a minimum of 13 staff (5 of them are either ornithologists or marine biologists), including a doctor. This gives us a staff to passenger ratio of 1:9. Many of our staff have 20-years, or more, experience working in the Canadian Arctic and other sensitive wildlife areas.

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.



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Our own internal accreditation training programs cover Zodiac driving, navigation, VHF radio operation, operating in polar bear country and managing and handling lethal (firearms) and non-lethal deterrents to protect against dangerous animals.

Passengers will use the ship as a floating platform to enjoy the scenery of the area. Once or twice per day the passengers will disembark the ship by Zodiacs or Helicopters 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 will be equipped with emergency/safety kits and will be paired with another Zodiac. If there is a plan to go ashore, a landing barrel full of emergency supplies will be placed at the landing site. At least 1 of the paired Zodiacs will have a firearm handler, who has completed all modules and levels of our internal accreditation courses. Helicopters will be equipped with emergency/safety kits, and will not land without a firearm bearer on board or already ashore. All staff, including the Zodiac drivers will have VHF radios to stay in contact with each other as well as the ship. However, nobody will go ashore if a bear is seen.

When cruising bird cliffs, all Zodiac drivers will 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 before leaving home. We review these general guidelines on ship before our first landing. In addition, prior to a particular landing or Zodiac cruise we always have two briefings, one on ship and one on shore or in the Zodiacs to explain the limits of the area and the guidelines for visiting a particular area (e.g. being quiet around bird cliffs).

If marine mammals are encountered by the ship or by Zodiac, we'll follow the IAATO Marine Wildlife Watching Guidelines (Whales & Dolphins, Seals and Seabirds) For Vessel & Zodiac Operations. Quark is an American company so we are aware of and follow the US Marine Mammal Protection act. Additionally, we are aware of and follow the guideline document; NOAA Whale Watching and Viewing Other Marine Mammals in Alaska.

Identification of Potential Impacts

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 and water quality and to marine fauna and flora, from shipboard operations include: fuel spills; waste disposal, including sewage disposal; marine incidents and accidents;



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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.

Fuel Spills - Ship Operations

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, 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.

Waste Disposal - Ship Operations

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 or waste generated during small boat activities, or in fact any adventure activities conducted ashore, or via Zodiacs or kayaks to the vessels for correct disposal.

Marine Incidents and Accidents - Ship Operations

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) and Intermediate Fuel Oil (IFO) as bunker in addition to smaller quantities of lubricating fluids, oils, Jet-A fuel, and unleaded gasoline.

Air Pollution - Ship Operations

Stack emissions from the vessel into the atmosphere are insignificant and will not cause any kind of direct or indirect impact. While 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.

Breaking Ice - Ship Operations

Our vessels will periodically break ice. Only a very small fraction of coastal fast ice and 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.

Impacts on Fauna and Flora - Ship Operations

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



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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.

Small Boat Operations

These operations include all activities using Zodiacs or kayaks for cruising and to 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.

Helicopter Operations

These operations include all activities using helicopters for aerial sightseeing and to 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 helicopter operation will have a limited residency time while en route to its landing destination, while ashore, and upon departure. Potential impacts from helicopter operations include: fuel spills; waste disposal; and incidents and accidents; all helicopter operations can also potentially disturb near shore fauna and flora.

Fuel Spills - Small Boat and Helicopter Operations

Zodiac and helicopter 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 and each helicopter carries a limited amount of Jet A1 aviation fuel. At most, two industry-approved, thick plastic, 20-liter containers of this mixture are carried in zodiacs, while 420 liters of Jet A1 fuel is carried in the helicopters. No fuel will be purposely discharged from the small boat or helicopter. Due to limited, 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.

Waste Disposal - Small Boat and Helicopter Operations

All refuse or waste generated during small boat and helicopter 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. Exhaust emissions from the helicopter into the atmosphere are insignificant and will not



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cause any kind of direct or indirect impact. While burning Jet A1 fuel the helicopters will produce normal amounts of hydrocarbon, heat and traces of chemical emissions.

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.

Incidents and Accidents - Small Boat and Helicopter Operations

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, or Jet A-1 fuel, and incidental discharge of refuse. Due to limited, MARPOL recommended fuel carried and adherence to Standard Operating Procedures, these impacts will be no more than minor or transitory.

Disturbance of Fauna and Flora - Small Boat and Helicopter Operations

Small boat & helicopter operations have the potential to directly disturb fauna and flora. Impacts to marine animals can result from habitat disruption through the boat or helicopter'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 or aircraft. Improper navigation and speed could result in harmful interference of marine animals or sea birds in the water, on ice floes, in the air, 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.

Landing and Shore Operations

Landings and shore operations will occur during small boat and helicopter excursions. Impacts are possible to flora and fauna, historic buildings, geologic and other features, and scientific studies. Damage can result from small boat landings, and also 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.

Impacts on Fauna and Floras - Landing and Shore Operations

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, helicopters 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.

Impacts on Other Features - Landing and Shore Operations

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



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pedestrians may create a situation for soil erosion in some areas, depending on the terrain. Physical contact, both by landing craft or 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.

Introduction of Alien Species and Diseases - Landing and Shore Operations

The physical presence of tourists in conjunction with small boat and helicopter 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.

Rescue Operations - Landing and Shore 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.

Cumulative Impacts - Landing and Shore Operations

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.

Mitigation

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.



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- 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, helicopters, 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 and helicopters 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.

Oil and Oily Mixtures - Ship Operations

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 the 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.

Garbage - Ship Operations

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.

Sewage - Ship Operations

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



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flocculates sewage, separating solids and liquids. Sewage sludge is drawn from the sewage treatment plant and incinerated.

Ballast - Ship Operations

QEI 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.

Pollutants - Ship Operations

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 QEI's Standard Operating Procedures and will be mitigated by clean-up efforts and through the natural dispersion that results from wind and wave action.

Disturbance of Marine Wildlife - Ship Operations

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.

Summary - Ship Operations

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.

Small Boat and Helicopter Operations

Small boat and helicopter 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, helicopter pilots, and kayakers will be briefed on appropriate behavior around wildlife. All Zodiac drivers must also



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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, helicopter 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.

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 and helicopter deck. Zodiacs, helicopters and kayaks will be cleaned before and after landings.

Safety during Landings – Landing and Shore Operations

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.

Historic Sites and Archaeological Sites – Shore Operations

Passengers will be thoroughly briefed on the significance of historic sites and monuments. Prior to inside 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.

Cumulative Impacts - Small Boat, Helicopter & Landing Operations



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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.