

Chapter 6



presented by



The Making of the Film *Great North*

GOALS

Learning about the study of caribou

Discovering the secrets of how *Great North* was filmed

Understanding navigation in the North

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STUDYING THE CARIBOU WITH TELEMETRY

What is satellite telemetry?

Satellite telemetry is an ingenious technique that uses data collected by land or water-based beacons equipped with radio transmitters. One of the best-known telemetry systems is the Argos program, jointly operated by the US and France. Argos can find the location of any beacon, anywhere in the world, to within 150 metres (492 feet). Many kinds of data can be collected and transmitted using telemetry — for example, temperature, water salinity and beacon function.



Since 1980, Argos transmitters have been placed on ships, scientific buoys and animals. Several birds, as well as land and sea mammals, are currently being studied using telemetry.

For a number of years, researchers have outfitted caribou with transmitting satellite collars, which can be used to compute the animals' location. Since the early 1990s, partners like Hydro-Québec, Canada's Department of National Defence, the Quebec Government's Société de la Faune et des Parcs, and the Government of Newfoundland and Labrador, have worked together to better understand caribou migration in northern Quebec and Labrador.

Map of Caribou Movement as Seen in Great North

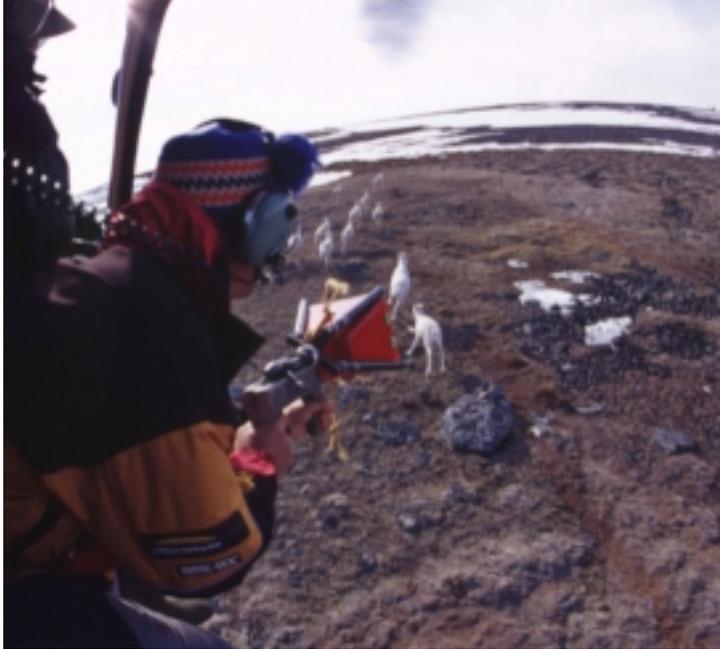


Currently, about 40 caribou are fitted with working collars. Two or three satellites belonging to the US National Oceanic and Atmospheric Administration (NOAA) — and specializing in tracking weather and environmental effects — have been fitted with receivers that gather information from the caribou transmitters. These satellites travel at a speed of 27 000 kilometres per hour (16,777 miles per hour), and an altitude of 870 kilometres (541 miles). They are on an orbit that sees them pass over the poles every 101 minutes. Data received by the satellites is re-transmitted to a station on Earth, where it is captured and analyzed by computer.

Once this data has been processed, the location of the caribou becomes accessible to

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researchers through a number of networks, including the Internet. In general, the location of Argos collars is known less than an hour after the satellites have flown over the caribou — who carry on happily, unaware that so much attention is being paid to their location.



Why follow the movement of the caribou?

Researchers follow the movement of the caribou to learn more about their migratory habits — and, as a result, to help with conservation.

For thousands of years, people have hunted animals as a means of subsistence. (Indigenous people still practice subsistence hunting — but today, sport hunting is popular as well.) To find prey, hunters look for signs of their passage, observe and follow their tracks, and learn as much as possible about migratory cycles. The observations made by hunters over the course of thousands of years have contributed to our understanding of the lives and habits of many different animals.

Until a few years ago, caribou researchers were limited to the same techniques that hunters use — without killing the animals, of course — to answer questions about where the animals live, what routes they follow, the number that die of natural causes and how to manage activities related to the caribou.

But advances in telecommunications and electronic miniaturization that began in the 1960s have allowed biologists to use telemetry to study animals. For years now, with the help of collars equipped with radio transmitters, researchers have been able to follow animals from a distance and receive regular updates on their location, physical condition and environment. Today, applied telemetry is used for even broader applications — providing researchers with tools they can use to answer more complex questions, and helping with ecological studies. One study, for instance, is trying to determine precisely which habitats are used by one herd of caribou.

If you think about the huge territory covered in a single year by a migrating caribou, you realize just how important telemetry is. For example, thanks to telemetry data from Argos, we know that the territory of northern Quebec's

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George River herd covers more than 800 000 square kilometres (308,882 square miles). Other herds bring the total area over which caribou range in the region to over 1 000 000 square kilometres (386,102 square miles). It would be pretty hard to physically follow the tracks and traces of these animals over the course of a whole year. And that's where satellite telemetry comes in: new technology helping science.



CARIBOU FILM STARS

How did telemetry help with the making of the film?

Everybody knows that there are lots of caribou in the North. But finding and filming them is another story! The area inhabited by the George River herd is twice the size of France. Time is short when you're making a film; cinematographers have to act quickly to find their subjects and get the right shot. In a film featuring caribou, telemetry research comes in handy.

The logistics of filming *Great North* were made much easier thanks to data on caribou position supplied by the Quebec government. With access to data transmitted by radio collars, researchers could advise the film crew about the best way to find the number of animals they would need. Even with this data in hand, some scenes required hours of preparation — and waiting — before they could be captured on film.

How did the making of *Great North* help the caribou?

First off, *Great North* allows giant-screen film¹ buffs (people like you!) to learn more about the caribou and their behaviour, and the relationships between caribou and humans. But the making of the film also helped to further our understanding of the caribou. In preparation for the calving scene, researchers and filmmakers observed and filmed many caribou births. (The animals came from northern Quebec, but were in captivity). Researchers had rarely had the opportunity to witness caribou calving in such detail.

Behind this sequence in *Great North* (the first caribou birth in giant-screen film) lies a project that was a whole year in the making — a very long time when you consider that the scene only lasts about three minutes! This project came into being thanks to TVA International (producers of *Great North*) and the Quebec government's ministry of wildlife and parks (officially known as la Société de la Faune et des Parcs), together with partners, including the Quebec ministry of natural resources and the Saint-Félicien "Wild" Zoo, located in Quebec City.

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Great North in Numbers

Camera: IMAX® 15/70
(15 perforations per 70mm frame)

Weight of camera, loaded:
45 kilograms (99 pounds)

Location shoots: 6 October 1998 (Schefferville, Canada); April 1999 (Kangijsuaq and Puvirnituaq, Canada); June 1999 (Saint-Félicien and Kuujuaq, Canada); September 1999 (Jokkmokk, Sweden)

Size of film set: Approximately 1 000 000 square kilometres (386,102 square miles)

Size of film crew: 8 to 20, depending on the location

Amount of time spent in the far North (Canada and Sweden):
4 months

Number of planes chartered: 27

Types of planes chartered:
Single Otter³, Twin Otter³, Navajo, Boeing 748, Cessna Caravan

Models of helicopters chartered from Aérospatiale: B2, D, BA and Dauphin

Hours spent in helicopters: 300

Number of snowmobiles rented: 12

Number of Inuit sleds (“qamutik”) used to transport equipment: 20

Length of exposed film:
72 kilometres (45 miles)

Rolls of film transported: 217
(with a total weight of 1 000 kilograms, or 2,205 pounds)

Length of one roll of film:
333 metres (1,093 feet)

Number of minutes you can shoot with one roll: 3

Minutes of film exposed: 651

Final length of *Great North*: 40 min.

Number of caribou filmed: We invite you to count them while watching *Great North*!

The calving scene was filmed in an experimental enclosure, designed especially for filming and for caribou studies. So, before filming, the enclosure had to be built, an expedition to capture the caribou was undertaken during the winter of 1998-99, and 22 caribou had to be transported more than 1 000 kilometres (621 miles) to the zoo. The births were filmed in June 1999. A veterinarian, working with several assistants, supervised the whole project. Once calving time came, the caribou were under 24-hour supervision — to make sure that none of the births was missed. The film crew got to watch 16 caribou births, and filmed several of them.



What was in it for the researchers? They got to conduct a study on the increase in body-weight of migratory caribou during the first years of their lives in ideal growth conditions. The study continues, long after filming ended, and the results will be compared with data

for caribou living in their natural, northern environment. The information will allow us to evaluate the physical condition of caribou in the wild to better understand the state of their health. There are some concerns that numbers in the George River herd are about to drop significantly. This study will help us understand if that's the case.

The filming process also allowed researchers to spend time observing Arctic fauna and place some new transmitter collars on caribou. There is a spectacular scene in the film in which Inuit host Adamie Inukpuk and wildlife biologist Serge Couturier capture a caribou and outfit it with a transmitter. Observant viewers will note that the number on the collar is 2408. Each collar has a unique identification number, so that the animal can be followed over the thousands of kilometres (or miles) it will travel during its annual migration. So the scene is more than just a pretty piece of filmmaking!

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FILMING IN THE NORTH **What effects does the environment have on filming in the North?**

There's no short answer to this question. First of all, the crew has to deal with a large, mostly uninhabited area. Access to goods and services most film crews take for granted (such as fuel, electricity and personnel) is limited. So before setting off, the crew has to make sure it has enough of everything — including enough people.

The weather, unpredictable at best, dictates how the filmmaker will prepare for a scene. Adamie, *Great North's* Inuit host, says that waiting “is not a waste of time.” That’s a rule that applies equally well to seal hunters and image hunters. Filming outdoors requires a great deal of patience. *Great North* was filmed in an area covering several hundred square kilometres (or miles). But weather conditions can kill the best-laid filming plans, so it was important to always have several backup plans. All this meant that long waits were inevitable.

Temperature has a significant effect, too. One of the most striking examples of this was the scene in *Great North* featuring mussel gathering under the ice. The crew shot the scene under the ice, where the temperature fluctuated around 0° Celsius (32° Fahrenheit). Meanwhile, above the 2-metre (6.6-foot) ice, the temperature was down around -20° to -30° Celsius (-4° to -22° Fahrenheit).



What methods of transportation do you use when filming in the far North?

The airplane remains the ideal mode of transport for establishing a base camp, because it allows lots of equipment and food to be moved in, in the shortest possible time. Once the base camp is set up, the helicopter becomes the aircraft method of choice. It can carry the crew to various shooting locations — sometimes over 100 kilometres (62 miles) from the base camp. Because helicopters can land almost anywhere, they give the crew access to spectacular shots at a moment's notice. The aerial scenes were filmed with the camera on a specially designed mount attached to the helicopter. With this rig, it was possible to capture arresting images of the northern landscape and its inhabitants.

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Does light play an important role for filmmakers in the North?

Definitely. Of course, light is always an essential element in the filmmaking process. Capturing the landscapes in *Great North* required good lighting. But there are other elements at play when filming in the Arctic — like the tremendous seasonal variation in the number of hours of daylight. For instance, during location-scouting in Sweden in February, the sun was in the sky for only two hours a day. On the other hand, summer film shoots allowed for much longer hours.



Filming in the winter presented several challenges, one of the most important of which was calculating flight time; the crew had to be back at base camp before nightfall. Fortunately for filmmakers in the North, there is a long magic hour in the region. This phenomenon occurs all over the world, but is more marked in the North. What is the magic hour? Sunlight hits the subject being filmed at different angles over the course of the day. When the sun is directly above the subject, the light is at its strongest. This is called “cold” light, and it is filtered less by the atmosphere than light coming in at an angle. When light strikes the subject at an angle and has to pass through a thicker layer of atmosphere, it is called

“hot.” The hottest light comes just after sunrise and just before sunset — this is the magic hour. At high latitudes, as in the Arctic, the sun is never directly over the subject; it remains quite low on the horizon. As a result, the magic hour lasts longer than it does farther south, allowing cinematographers more opportunities to shoot stunning images.



How do you orient yourself on this enormous film set?

Maps and compasses have long been essential tools for navigation in the North. Today people also use radio links between aircraft and the ground, earth-based guidance systems for larger aircraft and even systems that let you quickly locate an aircraft in the event of an emergency landing or an accident. For the last few years, airplanes and helicopters have also had access to highly sophisticated navigation methods such as GPS (Global Positioning System), which uses satellites to pinpoint location.

No matter what equipment is involved, though, the weather has the last word when it comes to travelling in the North. If it doesn't cooperate, you don't go anywhere.

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Shooting Stories

Sound recordist Leon Johnson was under close observation by a black bear for two hours during a shoot in Labrador, northern Canada. Shortly afterwards, he and his recording equipment were in the middle of a sea of caribou — about 10,000 of them.

The film crew's helicopter was requisitioned twice for emergency duty. It was used to answer distress calls near the northern Quebec community of Kuujjuaq.

Chimo, a young muskox at the Saint-Félicien Zoo, was quickly nicknamed “Crazy Kuujjuaq” thanks to his habit of entertaining himself by following the film crew's red truck and then charging wildly into it. Needless to say, they quickly traded it in for a green truck.

On the way to film the largest glacier in Norway, the production team had to land on the Swedish side of the glacier because they did not have a permit to land in Norway. As a result, they had to lug 140 kilograms (309 pounds) of film equipment for one kilometre (0.6 miles) on their backs!

Why a giant-screen film?

The tundra is an ecosystem of spectacular landscapes. The best way to show the grandeur of these vistas is on a giant screen. A television screen captures only a tiny portion of the landscape. TV is best-suited to medium and close-up shots. *Great North's* filmmakers opted for a medium that would capture a larger sense of the vastness of the North.

While conventional feature films use 35mm film², *Great North* was shot in 65mm. In order to be projected in giant-screen theatres, the image was then transferred to 70mm film. The giant screen is about eight storeys high, approximately 10 times larger than a conventional screen. What better way to see the great North?



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Glossary

¹ Giant-Screen Film:

Movie format using 70mm film, projected in theatres specially designed for showing films shot in this format. IMAX® and Goto® are two companies that provide equipment and services to the giant-screen industry. Kodak and Fuji produce 70mm film stock.

² Millimetres (mm):

Unit used to measure the size of photographic or movie film. The measurement is taken diagonally across one frame.

³ Single Otter and Twin Otter:

Airplanes designed by de Havilland Canada. These planes are widely used in the North, because they can land on unpaved landing strips or even on the tundra. The Twin Otter is renowned for its short take-off and landing abilities. It can also be equipped with floats, skis or even large “tundra tires”, depending on the season.

Activity

Become a Northern Filmmaker

Goal:

Learning about factors that affect making a film in the North

Materials:

2 standard dice

Paper and pencils

Reference books on the North (optional)

Directions:

1. Divide the group into seven teams
2. Give each team a copy of this text, which sets the scene:

“You are part of a major film crew. Your team flew into Kuujuaq, in Quebec’s far North, yesterday. It’s late March. The temperature this morning is -10° Celsius (14° Fahrenheit). The sky is magnificent — a filmmaker’s dream! Your mission is to prepare a list of the equipment you will need to shoot three Arctic scenes for the film *Great North*. The scenes show the capture of caribou by biologists. You have to do your planning, keeping in mind the weight of the gear and your budget.”

Here are the scenes you are going to film

(taken from the original screenplay by David Homel):

Scene 17

The capturing sequence as seen from the helicopter. The helicopter catches up to the stream of animals, the shooter chooses a caribou, shoots the net-gun and a caribou is brought down.

Scene 18

Helicopter lands and two men emerge, running: the scientist and the Inuit. They are dressed in different ways to show who represents the South, and who the North. They remove the net and sit on the caribou to apply the satellite collar. Both scientist and Inuit take an active part in the job.

Scene 19

The procedure is finished. The caribou gets to her feet and immediately runs to join the herd. We can see that the animal is unharmed.

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3. Give each team a copy of the equipment lists below.

Director of Photography (Item, weight in kilograms/pounds, price in dollars)

Camera battery (50 kg/110 lb., \$200 per day)
 Camera (30kg/66 pounds, \$1,000 per day)
 Video camera to film the film shoot (10 kg/22 lb., \$600)
 Aeronautical charts for northern Quebec (0.5 kg/1 lb., \$25)
 Topographical maps of Sweden (0.5 kg/1 lb., \$50)
 Director's chair (4 kg/9 lb., \$25)
 Battery recharger (30 kg/66 lb., \$50 per day)
 Office supplies — paper, pencils, etc. (5 kg/11 lb., \$50)
 Sound equipment (100 kg/220 lb., \$200 per day)
 Camera gear (550 kg/1,212 lb., \$500 per day)
 Stepladder (10 kg/22 lb., \$50)
 Special mount for aerial filming (50 kg/110 lb., \$200 per day)
 Camera lenses (37 kg/82 lb., \$500 rental)
 Book: The ABC's of Giant-Screen Film (1 kg/2 lb., \$22)
 Laptop computer (20 kg/44 lb., \$4,000)
 Rails for filming travelling shots (100 kg/220 lb., \$200 per day)
 Film stock for shooting in low light (45 kg/99 lb., \$1,000)
 Film stock for shooting in bright light (45 kg/99 lb., \$1,000)
 Sand in fabric bags, to stabilize the camera (60 kg/132 lb. including sand, \$100)
 Fax machine (5 kg/11 lb., \$300)
 Colour television (20 kg/44 lb., \$500)
 Camera tripod (10 kg/22 lb., \$50 per day)

Equipment for base camp (Item, weight in kilograms/pounds, price in dollars)

Fuel (20 barrels, one barrel per hour of helicopter use) (4 000 kg/8,818 lb., \$8,600)
 Camping equipment (200 kg/440 lb., \$3,000)
 Electronic games (10 kg/22 lb., \$400)
 Food for 8 people for 7 days (150 kg/330 lb., \$2,400)
 Satellite telephone (1 kg/2 lb., \$2,000)
 Chemical toilet (40 kg/88 lb., \$20 per day)
 First aid kit (20 kg/44 lb., \$50)
 Expedition clothing, per person (20 kg/44 lb., \$1,500)

4. Give each team a copy of the following information:

Transport*	Maximum Load	Cost	Notes
de Havilland Twin Otter	1257 kg	\$16/km	Plane equipped with skis. Can land on the tundra
Cessna 206	340 kg	\$1,50/km	Plane on floats
Astar BA Helicopter	450 kg	\$900/hour	Can land just about anywhere. Travels at an average of 120 km (75 miles) per hour.
Snowmobile	600 kg	\$200/day	Travels at an average of 25 km (15.5 miles) per hour

*Note: Snowmobile and all aircraft are based in Kuujuaq and must return there by nightfall. Only the helicopter can stay with the crew the whole time. 0.4536 kg = 1lb.

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Filming

The film shoot is expected to last seven days.

Weather

At this time of year, daytime highs average -13° Celsius (9° Fahrenheit) and nighttime lows average -24° Celsius (-11° Fahrenheit). Precipitation is primarily snow, and there is an average of 8 hours of daylight.

The Caribou

Thanks to telemetry, the crew's consulting biologist has determined that the caribou are 100 kilometres (62 miles) south-east of the village. The base camp will have to be set up in the middle of the tundra, near the caribou.

The Film Crew

The film crew consists of eight people: a director, a director of photography, a camera assistant, an equipment manager, a helicopter pilot, a consulting scientist, an Inuit assistant who will help with the caribou capture and a base camp-manager/cook. Each person weighs an average of 90 kg (198 pounds), with personal baggage weighing 40 kg (88 pounds).

5. Each team has a budget of \$100,000 to buy and rent equipment and charter transportation needed for the film shoot. Each team must include in its budget 15 hours of helicopter time (not counting unforeseen circumstances) and a cost of \$20,000 for transporting people and equipment from their departure point to Kuujuaq.
6. Ask each team to prepare a list of the equipment they will take with them from Kuujuaq to the base camp. Then ask each team to specify what form of transportation they will use. They will have to make sure not to overload the aircraft or go over budget.
7. As a supplementary exercise, ask each team to list, on a separate sheet of paper which material comes under the categories of camping, first aid kit and food.

Note to teachers/group leaders:

if you are working with a younger group, instruction number 7 can replace numbers 5 and 6.

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Let's Explore Some More:

8. Read the following scenario to the entire group: Your base camp is set up and you have seven days to film your sequence. According to your calculations, three full days of work should be enough — but when you are filming in the far North, expect the unexpected! Will you be able to shoot three full days without going over budget, and with the equipment at your disposal? We'll see!
9. The first team rolls two dice and looks at the chart on page 13. Each team looks at the instructions and responds accordingly, by adjusting their budget or their equipment. Go around the table to discuss the solutions (equipment used, cost of operations, etc.) that each team chose.
10. Repeat the previous step six times with a different team rolling the dice each time. After seven days (and seven rolls of the dice), determine whether three days of shooting could be completed, and if each team stayed within its budget.

Questions:

Why do we study the caribou? Why do we use telemetry to study certain aspects of the life of the caribou? Do you know of any other studies on wild animals? What techniques do they use?

How did telemetry help with the making of the film *Great North*? What does the film do for the caribou? Do you know of any other examples of cooperation between scientists and filmmakers? What precautions must be taken to avoid harming the animals?

What are the main problems associated with filming in the North? What innovative solutions do people come up with to deal with them? What difficulties have you had to face in filming something or taking photos? What solutions did you find?

What makes navigation in the North more complicated than elsewhere? What tools allow us to orient ourselves, despite the challenges? Which of these tools do you use, or have around you, in your daily life? Do you know of any other, less technologically advanced methods?

Resources

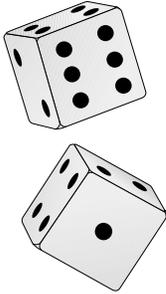
WEB SITES

Great North The Movie: www.great-north.com

IMAX® Corporation: www.imax.com

Wildlife telemetry using the Argos system: www.argosinc.com

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Note to group leaders:
The teams may offer all kinds of original solutions and imagine a variety of possible situations. These may be outside the original scope of the activity. No problem! There is no one right answer. Encourage discussion by asking questions about their choices; make sure they haven't forgotten anything, and that they stick to using the material they have available and stay within their budget.

Results of Dice Throws (2 six-sided dice)

- 2** Respond to a distress call 200 kilometres (124 miles) south-east of the base camp. Two injured people have to be transported from the site of their accident to Kuujjuaq. Health services will reimburse you for your costs — later — of course. But in the meantime, you can't film today.
- 3** The helicopter pilot is seriously ill. Early in the morning, you decide to get him to a doctor to be examined. No shooting today.
- 4** The main camera is out of order. A replacement part ordered from a supplier in Montreal (Canada) arrived at noon, and you have to go pick it up at Kuujjuaq airport. The cost of the part, transportation from Montreal included, is \$250. Another day of filming lost.
- 5** Due to unforeseen events, your fuel reserves are low. You must buy 12 more barrels in the village. At the same time, you have an opportunity to film muskoxen 75 kilometres (47 miles) from the base camp. This wasn't part of your shooting plan, but it's too good an opportunity to miss!
- 6** Cloud cover results in reduced lighting conditions. You will have to use more sensitive film stock, but you can shoot today.
- 7** No problems on the horizon. You will be able to film a scene today!
- 8** A beautiful day — ideal for filming the aerial scene from the helicopter.
- 9** A snowstorm has blanketed the region. The snowfall means the helicopter won't be able to take off today.
- 10** It hasn't been possible to receive telemetry data to locate the caribou today. Instead, you spend the day on reconnaissance flights.
- 11** The caribou herd is out of range of the base camp. You have to move the camp 50 kilometres (31 miles) farther south-east. The whole day will be spent on the move.
- 12** An aircraft is stuck on the tundra, out of fuel, about 300 kilometres (186 miles) from the base camp. You've been asked to deliver a barrel of fuel from your reserve. You will be reimbursed for the cost of the fuel, but you won't be able to film today.