

Tracking Trek Online

Wounded soldiers make historic North Pole expedition

By Carla Wheeler, Esri Writer



When Fridtjof Nansen and Hjalmar Johansen left the ship *Fram* in 1895 to try and reach the North Pole using sled dogs, no one heard from them for more than a year. Friends and relatives could only guess where they were on the map.

But when members of the Walking with the Wounded (WWTW) charity organization recently braved treacherous ice ridges, dangerous fjords, and bitter subzero temperatures to reach the geographic North Pole, people around the world were able to follow along online using an interactive map created by ESRI (UK) Ltd.

The seven expedition members included four wounded ex-servicemen from the United Kingdom. They triumphantly

arrived at 90 degrees north on April 16, 2011, completing a 13-day, 200-mile trek across the frozen Arctic. The expedition made history because the team included two men who became the first amputees to reach the North Pole unaided.

Britain's Prince Harry, the expedition's patron, joined them for the first three days of the four-week trek. The expedition raised money for training, therapy, and other types of support for British service members who return home from war injured or traumatized.

In a statement on the WWTW website, Prince Harry summed up why he supported the venture. "This extraordinary expedition [raises] awareness of the debt that this country owes to



➤ People could keep tabs on the current location of the WWTW using the online map.

➤ This historic map from the Royal Geographical Society shows the route Sir Walter William Herbert took to the North Pole.

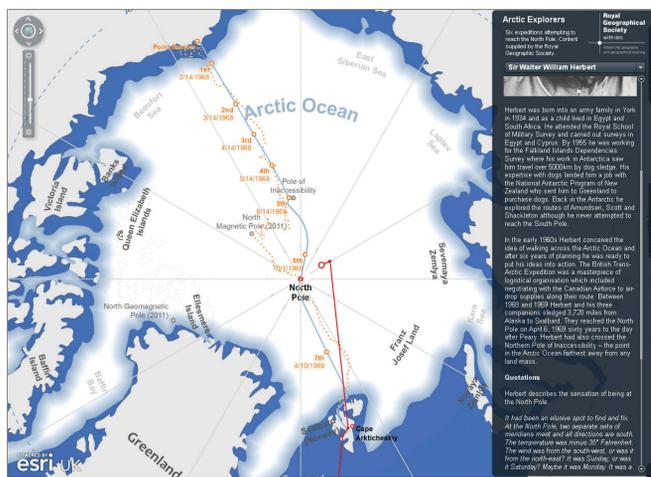
← The skiers take a moment to look out over the Arctic. Britain's Prince Harry, a team member early in the journey, called the North Pole "the last true wilderness on Earth." (Photo courtesy of Walking with the Wounded)

those it sends off to fight—only for them to return wounded and scarred, physically and emotionally.... This polar adventure [exemplifies] the tenacity and remarkable courage of those who serve in uniform."

The WWTW route stretched from London to Longyearbyen, Norway, where the team was initially delayed for several days due to bad weather. The explorers took a plane north on April 4, crossing the icescape to Camp Barneo, a Russian ice base, then to 87 degrees north, where the men, by now in a helicopter, landed and officially began the trek. Bundled in red, heavily insulated jackets and pants, they strapped on skis and headed off into the wilderness of snow and ice.

The interactive map created by ESRI (UK) covered the Arctic region and displayed the men's location based on GPS coordinates relayed back to WWTW headquarters. It highlighted key points of interest and let visitors follow the expedition's progress in near real time.

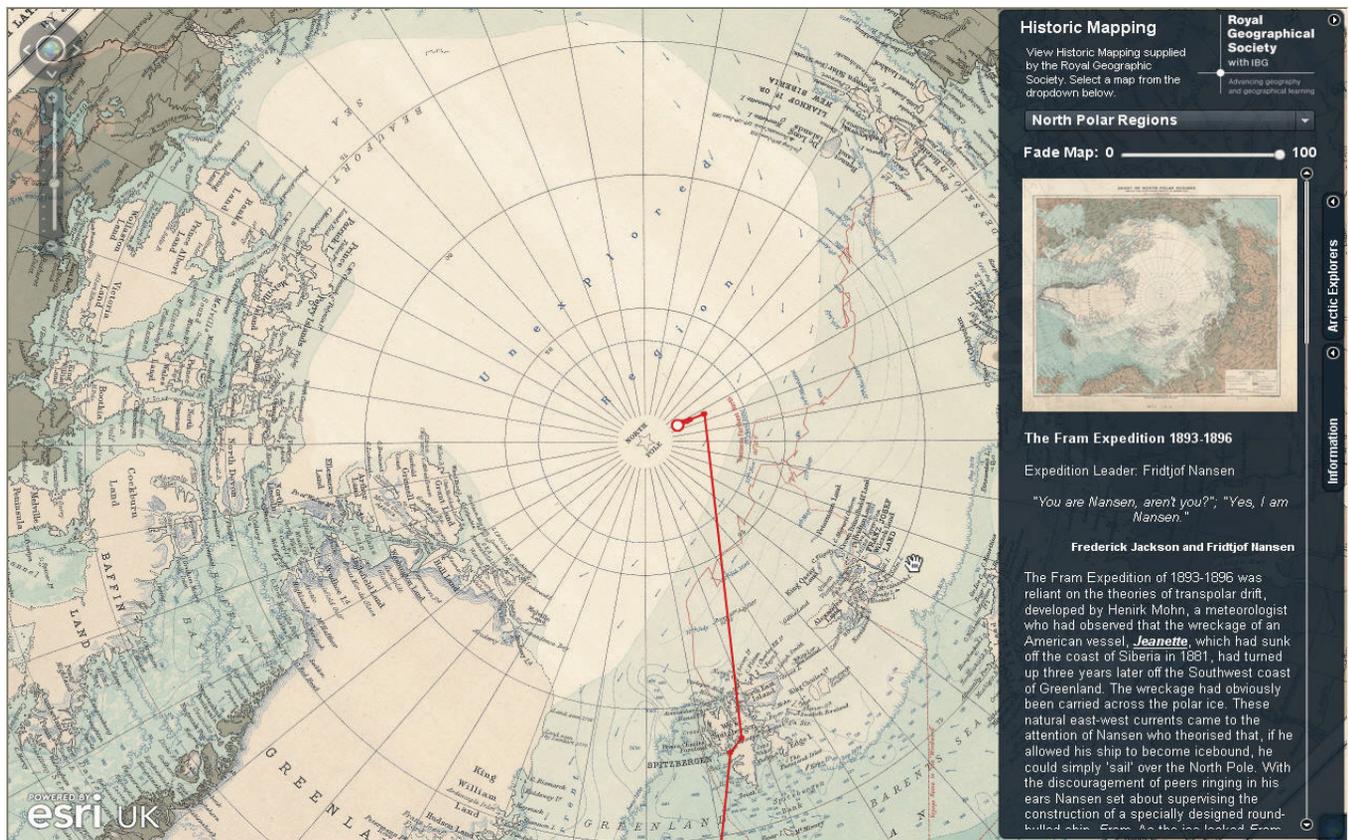
People in the United Kingdom and elsewhere kept up with the adventure by viewing the interactive map and reading the blog that provided the latest photos and audio from the modern-day polar explorers on the WWTW website (walking-withthewounded.org.uk).



Map Design and Development

Using ArcGIS Server, ESRI (UK) developed an interactive mapping application that combines the WWTW team's expedition route with historic information provided by the Royal Geographical Society (RGS). The route of previous expeditions, along with historic maps and charts, can be examined online. In many cases, this has been the first opportunity for the public to examine these maps.

Users can navigate across the Arctic region and explore for themselves places such as Beaufort Sea, the Queen Elizabeth Islands, Franz Josef Land, and the Kara Sea. Visitors can also read stories about early famous polar expeditions such ➤



↑ Using the interactive map developed by ESRI (UK), visitors can call up interesting stories about historic polar expeditions, such as the journey by Norwegian explorer Fridtjof Nansen, who attempted to reach the North Pole in the ship *Fram*.

as those of Robert Peary and Sir William Edward Parry, Roald Amundsen, and Sir Walter William Herbert.

Peter Wilkinson, head of the ESRI (UK) Technical Solutions Group, led a two-person team that designed and developed the web map viewer and widgets for WWTW. He said that adding the routes and stories of those explorers, along with historic maps and charts of the Arctic, added an educational element to the mapping application to create more interest for schoolchildren, teenagers, and adults alike.

"We wanted to create a more engaging site to help people learn more about the Arctic," Wilkinson said. "We want people to see that the Walking with the Wounded team members are following in the footsteps of some incredibly notable Arctic explorers."

The RGS archives supplied historic maps, charts, stories, and photographs of six explorers, whose attempts to reach the North Pole dated from the early 1800s to the late 1960s. ESRI (UK) worked with maps and charts scanned from the original documents in the RGS archives. "Being mapping enthusiasts, it was quite an honor to be able to work with the original maps and bring them to life with our interactive map," Wilkinson said.

Esri's ArcGIS Desktop 10 was used for data management and creating the map (MXD) documents. Wilkinson said there were a number of challenges, including sourcing up-to-date information for the Arctic region, such as the latest sea ice

extents, and working in unfamiliar polar projections. "We were particularly keen to create a good-looking basemap that could form the basis of the website," he said. The team used cartography tools in ArcGIS ArcMap to get the basemap just right.

The online mapping application was built using Esri's ArcGIS Viewer for Flex 2.2, a ready-to-deploy viewer that is configurable for adding additional tools and data content. The ESRI (UK) technical team developed additional Flex widgets such as pop-up dialog boxes, fader bars, and an administration console that the WWTW staff used to update the expedition team's route on the map.

Wilkinson said that when the men's coordinates were relayed back to Britain from the Arctic, the WWTW support team added the latitude and longitude to the administration console. The points were stored in the geodatabase and displayed dynamically on the map, with a line drawn back to the last recorded location, thus creating a route. Clicking on a specific point on the route displays an information window showing the location and date and a link to the relevant WWTW blog post.

ArcGIS API for JavaScript (Compact Build) 2.2 was used to create an application that replicated the functionality of the embedded WWTW map viewer but could be accessed from a mobile device, such as Apple's iPhone or iPad, or environments where the Flex plug-in is not supported.

The WWTW expedition generated worldwide media attention, especially since Prince Harry lent his support by skiing part of the way with the WWTW team. To handle heavy traffic on the mapping application site, ESRI (UK) decided to use ArcGIS Server running on Amazon's Elastic Compute Cloud (EC2). A cloud approach was chosen for its scalability, its quick response times, and the flexibility it provided in handling fluctuations in demand.

For Wilkinson, creating the mapping application was a fascinating learning experience, in part because the project demanded using unfamiliar datasets from Canada, Russia, Norway, and the United States. Also, there were challenges associated with what Wilkinson called the "peculiarities" in the projections used to create maps of the polar regions, which required mapping the world from the top down rather than viewing the globe laterally from left to right. "But it wasn't just a challenging project; it was also extremely fulfilling, in that we knew our interactive mapping application was supporting a unique expedition led by an incredibly brave team of soldiers," he said.

North Pole Was the WWTW Goal

WWTW was founded by Simon Daghish and Edward Parker. Parker's nephew was seriously injured in Helmand Province

in Afghanistan in 2009, inspiring Parker and Daghish to set up the charity organization. The charity's goal is to raise 2 million British pounds (US\$3.2 million) to fund job training and recovery programs for wounded service members.

Besides being a fund-raiser, the WWTW expedition is meant to spotlight the strength, endurance, and determination of soldiers who have overcome what may seem like insurmountable obstacles to achieve such a major physical feat as reaching the North Pole: Martin Hewitt, whose right arm was paralyzed after he was shot; Steve Young, who suffered a fractured vertebra and other injuries after an improvised explosive device (IED) hit his vehicle; Guy Disney, who lost his right leg below the knee after a grenade attack; and Jaco Van Gass, who lost his left arm after he was struck by a rocket-propelled grenade. Both Daghish and Parker joined the expedition, which was led by polar guide Inge Solheim and trainer Henry Crookson.

Richard Waite, managing director for ESRI (UK), said the company was honored to create the online mapping viewer to keep people apprised of the trek's progress. "We were extremely proud to support such an inspirational expedition," Waite said. "The incredibly brave individuals who took part not only raised much-needed funds but also proved that disability is no barrier to endeavor and achievement."

↓ The 13-day trek to the North Pole took strength and endurance. (Photo courtesy of Walking with the Wounded)

