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*ABOUT THE AUTHOR:*

Árni Einarsson, born 1954, studied biology and palaeo-ecology at the University of Iceland and has a Ph.D. degree in animal ecology from the University of Aberdeen, Scotland. His research career has mostly revolved around various aspects of the unique Lake Myvatn Nature Reserve in Iceland. This includes long-term studies of waterbirds, fish, insects, plants and microorganism, and also tracing the environmental history of Lake Myvatn employing palaeo-ecological techniques. At the same time the author has also engaged in studies of medieval literature. More lately, teaming up with archaeologists, he studied an extensive system of Viking Age turf-built walls in Iceland. After mapping their extent in NE-Iceland, using low-flying aircraft, aerial photos and satellite images, combined with long field walks, an ancient settlement pattern emerged that allowed the location of a number of hitherto unknown farms dating to the Viking Age. A book on the subject was published in 2019. An extended search in southern Iceland revealed several more wall systems and Viking Age farms. The author is currently a guest professor at the University of Iceland and director of the Myvatn Research Station, a nature field research institute under the auspices of the Icelandic Ministry for the Environment.

*THE COVER IMAGE:*

A tilted satellite image from 7 October 2014 (© 2014 Maxar Technologies) of River Bay, looking south-east. The mouth of Lake River in the foreground to the right. A graveyard upper left. A: The alleged 38 m (124 feet) longhouse "toft". B: The oval 9 m (30 feet) long "toft" flanked by two bushes at the seashore.

## **A Viking Age Longhouse by River Bay, Newfoundland.**

by Árni Einarsson<sup>1</sup>

### **Abstract**

After spending years mapping and documenting Viking Age earthworks and farm ruins in Iceland, finding that many such features are still visible on the surface, the current author carried on to see what the trained eye might observe in other parts of the Viking range. Satellite images reveal structures in Newfoundland that strongly resemble a ruin of a 38 m long Viking Age longhouse and another, much smaller house nearby. The site is at River Bay near Cape Norman, at the tip of the Great Northern Peninsula. No similar features were observed elsewhere in Newfoundland at this distance and resolution. The site is only matched by the Viking Age archaeological site of L'Anse aux Meadows, 25 km east of River Bay. Both are similarly placed on the coast and the local settings share many characteristics. The features at River Bay were discovered in 2019 but due to travel restrictions associated with the COVID-19 pandemic a ground survey has not yet been carried out.

### **1. Introduction**

#### *a. The sagas*

Two medieval sagas, the *Saga of the Greenlanders* and *Erik the Red's Saga*, relate about a series of voyages of people from Greenland and Iceland around the year 1000 to the recently

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discovered Vinland. The texts have navigational and geographical details, and credible observations of native people and the natural environment, that place Vinland in North America, around the Gulf of St. Lawrence. According to the sagas some of the groups of voyagers included men, women and domestic animals, because they intended to make permanent settlements. They explored the region, built houses, overwintered and extracted various natural resources and brought some back to Greenland. Their attempt to settle was abandoned, as the sagas relate, due to escalating hostilities between the settlers and native people. The Vinland expeditions comprise the first known contact of European people with America. (About the Sagas see e.g. Sigurðsson 2004 and 2008.)

In 1960 Helge and Anne-Stine Ingstad, located the remains of a Viking Age settlement at *L'Anse aux Meadows*, almost the northernmost tip of Newfoundland (Fig. 2). Subsequent archaeological excavations, led by Anne Stine Ingstad (Ingstad 1985; Ingstad and Ingstad 2000), and Parks of Canada (Bengt Schönback and Birgitta Wallace) revealed three large longhouse structures and several smaller houses. There was a clear archaeological link to Greenland and Iceland and also to the area further south, around the Gulf of St. Lawrence (Fig. 3) but no clear evidence of animal husbandry was found. The joint conclusion from the excavations and the saga narration was that while the site may have been part of Vinland it was probably a staging point between Greenland and the heart of Vinland further south. From the small midden deposits and the narrow range of radiocarbon ages it was concluded that the settlement was short lived. Altogether the buildings could accommodate 70–90 people. The archaeological features at *L'Anse aux Meadows* has remained the only physical evidence of Viking Age settlement in the region (Wallace 2000, 2003, 2012; see Ledger et al. 2019 and Kuitens et al. 2021 for the latest study). It has been declared a *National Historic Site* and a *World Heritage Site*.

#### *b. The Iceland project*

For many years the present author has been engaged in a comprehensive survey of above-ground archaeological structures dating back to the Viking Age in Iceland (Einarsson and Aldred 2011, Einarsson 2015, 2019). These include remains of houses, extensive turf-built wall systems, burials and assembly sites (Fig. 1). They are best observed from above, with the aid of a low-flying aeroplane, drone or satellite. Key factors for observation are a low angle of sunlight and a time period outside the growing season. Snow sometimes helps: archaeological

features sometimes stick out of the snow cover, which makes them conspicuous. Despite lower resolution, satellite images often reveal more features than does conventional aerial photography. Ever improving spatial resolution has made satellite images a very effective tool for locating archaeological features, and their availability on *Google Earth* has been a major benefit.

### *c. Looking for sites in Newfoundland*

With the success in Iceland it seemed appropriate to examine satellite images from other regions. After informal studies showed that the experience gained in Iceland might partly work in other regions, Newfoundland seemed an interesting option. The sagas mention domestic animals and milk products in *Vinland*, which means that some enclosures might be expected, if not at *L'Anse aux Meadows* then somewhere else in Newfoundland. Another reason to look for walls was that remains of ancient turf walls still surround a farm in West Iceland where *Guðríður Þorbjarnardóttir*, a central character in the *Vinland Sagas*, was said to be born (*Laugarbrekka*, Fig. 2). More house ruins were also to be expected in Newfoundland. The longhouse remains at *L'Anse aux Meadows* were clearly visible on the surface 60 years ago and were indeed pointed out to the Ingstads by local people (Wallace 2012: 29–30).

After studying the *L'Anse aux Meadows* site on satellite images, and becoming familiar with the landscape, soil and vegetation by studying published ground-level photographs, the next step was to examine other potential landing sites along the Newfoundland coast. These would include sheltered navigable bays with gently sloping sandy or gravelly shores near fresh water, and a good size, flat and dry piece of land to support daily activities of a shipload of people. These criteria excluded much of the Newfoundland coast which is predominantly exposed and rocky. Attention was quickly drawn to a structure at *River Bay* about 25 km west of *L'Anse aux Meadows*. This structure bore striking resemblance to longhouses from the Iceland survey. It turned out that nothing similar was to be seen in any other parts of the coastline. Another potential, but much smaller house ruin was located right on the shore at *River Bay* only 70 m from the suspected longhouse. It too looked much alike many ancient ruins in Iceland.

In this report the two potential archaeological structures at *River Bay* are described as they appear on satellite images and are compared to similar structures seen in Iceland. The origin of the structures is currently uncertain. An archaeological survey is not available yet for *River Bay* (J. Brake, Provincial Archaeology Office, pers. com.) and the author is not aware of any

information that might suggest it is not an archaeological feature. Realizing the potential importance of this find, and facing the long time (due to the pandemic) until proper ground work can be done, the present author feels it serves no purpose to delay its reporting. This report is an augmented version of a report delivered to the Newfoundland Provincial Archaeology Office on 1 February 2021.

## 2. The images

Satellite images used were the following:

12 Sept 2012 (Maxar Technologies),

7 Oct 2014 (Maxar Technologies),

20 Sept 2019 (CNES/Airbus),

9 March 2020 (CNES/Airbus).

All the images were accessed on *Google Earth*. The image from 7 Oct 2014 was the best in terms of resolution, light conditions and time of year. The 2012 and 2019 images served to confirm that the structure looks similar under other conditions, but they did not add any detail. In the winter image, from March 2020, most of the land was covered by snow but some of it had been blown off higher ground, exposing the rim of the suspected longhouse ruin. This added a welcome third dimension to the structure (Fig. 6) and reinforced its current interpretation. The initial observations on *River Bay* were made in August 2019 (A. Einarsson. *Potential Archaeological Sites in Newfoundland – a Memo*, August 2019, unpublished).

## 3. The landscape

*River Bay* is a small bay at the bottom of the bigger *Cape Norman Bay* which cuts into the northwesternmost tip of the *Great Northern Peninsula* of Newfoundland. The landscape is rather flat, most of it is between 10 and 20 m a.s.l. rising slightly over 30 m in places (Fig. 3). The bedrock is exposed in cliffs along most of the coastline and also on top of the higher ground, but depressions have mires with a number of small lakes and ponds. Open streams are few in the region. The principal one is *Lake River*, a small stream which drains *Duck Pond* into the *River Bay*. Most of the shore is rocky with about 10 m high cliffs and very exposed. There are several sheltered bays, two of which have fishing harbours (*Cook's Harbour* and *Wild Bight*) but apart from *River Bay*, most other bays are too small and have too little flat space around them to sustain any activity. Most bay-shores in the region have a series of curved ridges, parallel to the shoreline. These may have been created by storm surges, sea-ice or both (see Gilbert 1990). This regular micro-landscape on the shore helped locating the longhouse at

*River Bay*. Placed at an angle to the ridges the suspected longhouse catches the eye as a superimposed, hence man-made structure.

The Great Northern Peninsula is not well suited for agriculture but is well located with respect to marine resources, with rich fishing grounds, bird nesting colonies (Kirkham and Montevicchi 1982; Pope 2009) and close to migration routes of both seals and whales (Stenson 1994; McLeod et al. 2008). The area around Cape Norman Bay has no trees, and it is unclear if trees ever grew in this exposed area. The less barren but otherwise quite similar *L'Anse aux Meadows* had a substantial forest before European colonization (Davis et al. 1988, Ledger et al. 2019). Sea level changes over the last millennium seem relatively small (Bell et al. 2005).

#### 4. The structures

The Icelandic language has the word '*toft*' for the type of ruins described in this report and it will be used here. A *toft* is the remaining base of a house, obscured to a varying degree by collapsed building material (turf mostly) from the walls and roof, and by natural accumulation of soil. A *toft* usually comprises a square, rectangular or oval rim, corresponding to the base outline of the house, defined by the wall foundations, and a depression in the middle. In an Icelandic longhouse *toft* this central depression often appears just as a long, narrow cut in the feature (see Fig. 1, top right). In Iceland, undisturbed Viking Age *tofts* are covered by vegetation that does not differ much from the vegetation in the surrounding landscape. In younger *tofts* (19th to early 20th century) the vegetation usually contrasts with the surroundings (cf. Fig. 1, bottom right).

For the purpose of this report the main structure at River Bay will be termed, without reservation, *the longhouse* or *the longhouse toft*, quite aware of the possibility that it may not be one. Only archaeological fieldwork can reveal the true nature of the structures.

There were two apparent structures on the satellite images: a potential 38 m × c.7 m longhouse *toft*, 90 m from the seashore, at 51°36.467' N and 55°53.104' W, and the much smaller c.9 × c.4 m *toft* at the shore at 51°36.506' N and 55°53.131' W. The longhouse *toft* looks almost identical to several structures in Iceland, both ones that have been securely dated to the Viking Age and others that have tentatively been identified as 10th to 11th century longhouses (Figs. 1 and 8). The *River Bay* longhouse *toft* is tapering towards the ends, which is a signature character of

Viking Age longhouse design (Ólafsson 2004, p. 132, Stefánsson 2013, p. 54), although in an unexcavated *toft* this shape might be influenced by post-occupation wall collapse.

In an attempt to enhance the image, the snow image from March 2020 was superimposed on the Oct 2014 image (Figs. 6 and 7). The two images were aligned by matching the outlines of the graveyard, which were well defined on both. The features sticking out of the snow appeared dark on the 2020 image. With this procedure the full outline of the longhouse appeared. Before the snow image was added, the east end of the longhouse was truncated.

The small 9×4 m house ruin has an elliptic outline, and resembles several small Viking Age house ruins in Iceland (Fig. 1, middle right). Its interpretation as a *toft* is not secure, but the feature appears on all the snow-free satellite images (faintly though on the image from 2019).

## 5. Discussion

The main argument for the *River Bay* longhouse is that on satellite images it looks very similar to known longhouse structures in Iceland. Its size and proportions are typical, and its apparent tapering towards the ends would be typical of Viking Age halls (Figs 1, 4 and 8). Another argument is that there is another typical Viking Age *toft* nearby, i.e. the 9 m long oval house on the seashore. A third, but less direct argument is that the *tofts* seems unique. All other archaeological features observed on the satellite images of Newfoundland (apart from those at *L'Anse aux Meadows*) were characterized by strictly rectangular shapes.

A fourth argument concerns the location. Simply put, the *River Bay* location mirrors that of *L'Anse aux Meadows*, both geographically and in terms of local settings (Fig. 3). All the benefits of the *L'Anse aux Meadows* site also apply to the *River Bay* site. Both appear to be good landing sites and have running freshwater nearby. The sites are strategically identical. They would be well placed as base camps for transit of goods from *Vinland* to *Greenland* and as points of arrival when coming from *Greenland*. Both should be easy to find when arriving or in transit, and would make excellent watchposts for other ships arriving in the area, one on each corner at the tip of the *Great Northern Peninsula* (Fig. 3). The location at the extremity of Newfoundland would also seem relatively safe against potential (real or imagined) interference by natives. Both localities seem equally well placed for sea fishing as well as for intercepting sea mammal migration.

What might the the *River Bay* site mean in the overall context of *Vinland*? Was it possibly a first settlement, abandoned when a marginally better location was discovered at *L'Anse aux Meadows*? At first glance the *River Bay* seems more barren than *L'Anse aux Meadows*, but this judgement is based on the present landscape, which probably was different a millennium ago. It seems equally plausible that the two sites were complementary as watchposts. The answers hinge on exact dating, but with the accuracy of available dating methods it might, however, be a challenging hypothesis to test (but see Kuitens et al. 2021 about exact dating of wood cut with iron tools at *L'Anse aux Meadows*).

One possibility is that the two sites represent two households in a conscious effort to colonize the area. Farming may not have been an option this far north, but for marine resources two bases may have been more effective than one. Pure rivalry may also have played a part, and some fateful course of events, such as shipwreck leading to the establishment of two camps, cannot be ruled out either.

The distance (25 km or about 15 miles) between the two sites is not huge and together *River Bay* and *L'Anse aux Meadows* might indicate a pioneer community. Further search in the region may therefore be warranted. *Ha Ha Bay*, midway between *River Bay* and *L'Anse aux Meadows*, would seem a possible candidate. It has what at a glance looks like an ancient turf-built fence above the village Raleigh (see Appendix).

Finally, if the *River Bay* turns out to be what is suggested here, it should add significantly to the data at hand about the *Vinland* voyages, – about the participants, about their timing, about the natural resources utilized and possibly livestock brought there, and last but not least their interactions with the indigenous people.

### **Acknowledgements**

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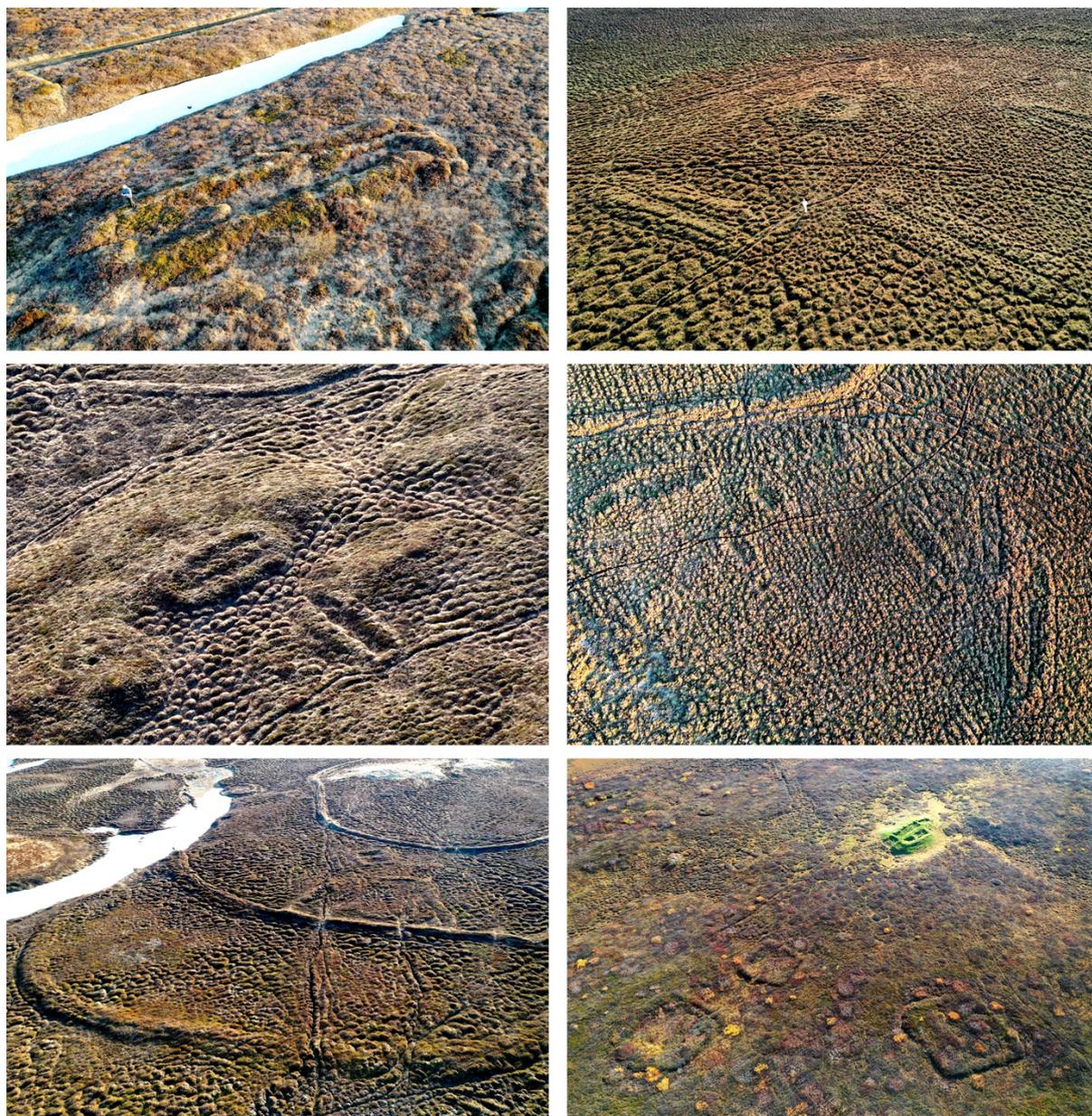


Fig. 1. A collection of Viking Age surface features recently documented by oblique aerial imagery in Iceland. Top left: a 30 m longhouse '*toft*' in North Iceland (cf. fig. 8). Top right: two 25 m longhouse '*tofts*' in South Iceland. Middle left: a 15 m house in North Iceland. Middle right: a group of longhouses in South Iceland. Note the small oval features and compare with the small oval feature in River Bay. The longhouse '*toft*' on the far right is 29 m long, the other two next to it 20 m each. Bottom left: concentric turf-built enclosures surrounding a farm, North Iceland. Longhouse remains can be seen behind the middle wall. Bottom right: three small square enclosures with unknown function, in North Iceland. (Similar structures can be seen at L'Anse aux Meadows). All the structures have been dated by typology, context and surface appearance, with no excavations as yet. (Photos by the author.)

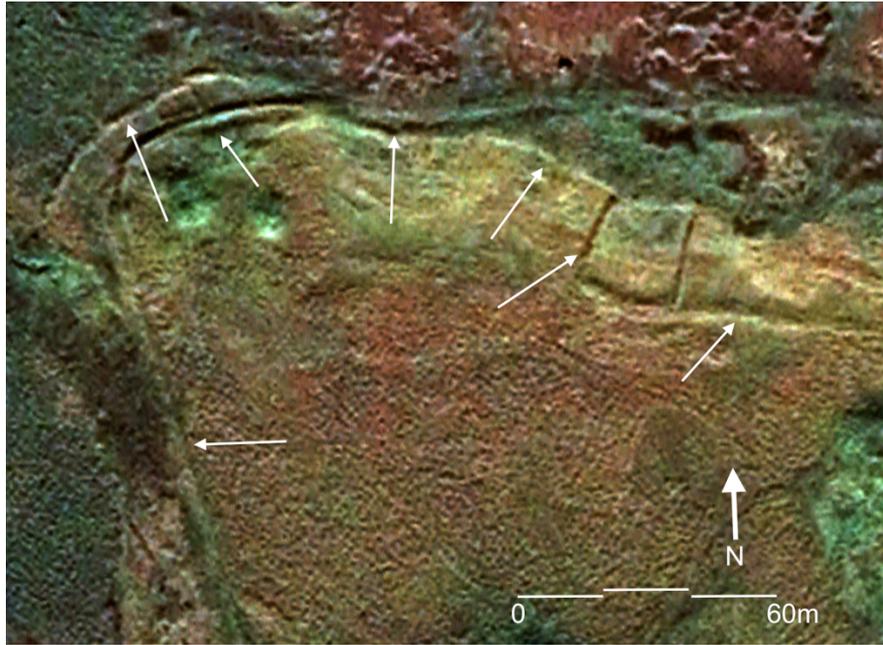


Fig. 2. Turf wall remains (thin arrows), probably from the 10th–11th century, surrounding the farm *Laugabrekka*, the alleged birthplace of *Guðríður Þorbjarnardóttir* in Iceland. Location is 64°45.316'N; 23°40828'W. Satellite image © CNES/Airbus3 September 2019. Colours are exaggerated.

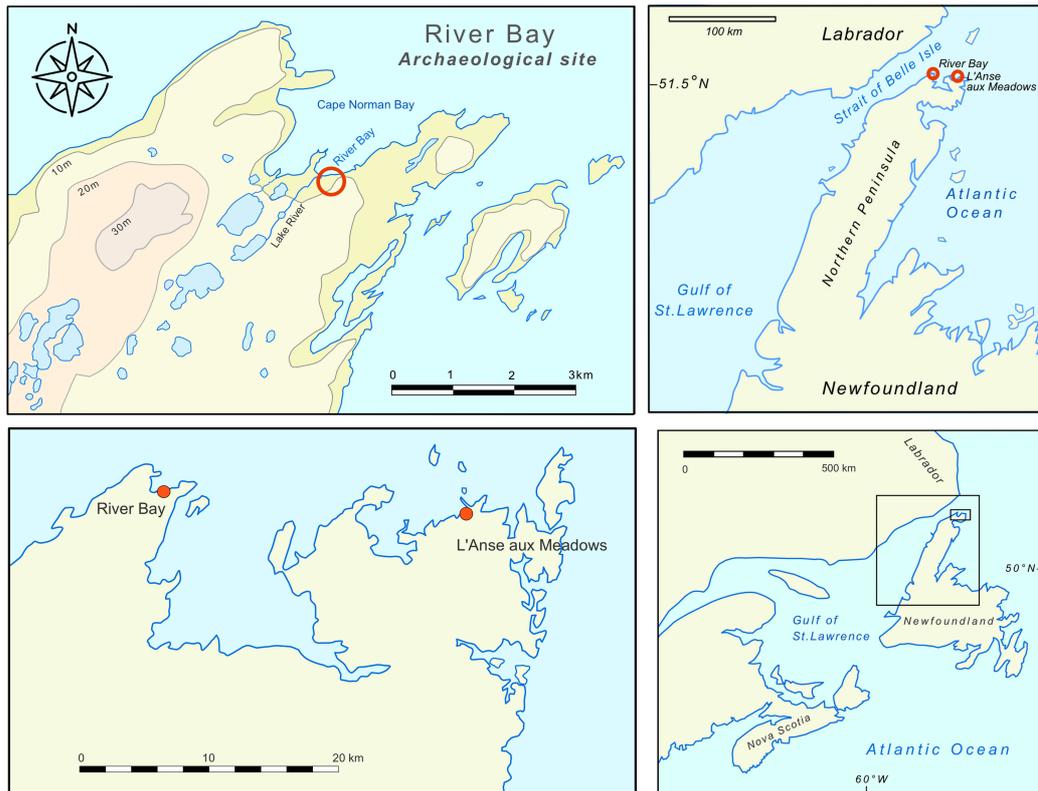


Fig. 3. Location of the River Bay and L'Anse aux Meadows archaeological sites on the tip of the Northern Peninsula of Newfoundland. The figure on the lower right shows the regional geography around the Gulf of St. Lawrence, with the locations of the other maps indicated.



Fig. 4. Satellite image of River Bay. Arrows point to the house ruins (also enlarged in the inserts). Please note that shadows are on the north (seaward) side of the ruins, which is crucial for an undistorted interpretation of the ruin. The large rectangular structure is a graveyard. © 2014 Maxar Technologies.



RiverBay\_closeup.jpg

Fig. 5. Location of the house 'tofts' at River Bay (red).



Fig. 6. Upper: The satellite image from October 2014. Lower: The same area under snow in March 2020. Snow-free rims appear as dark patches. The red squares mark the corners of the graveyard used to match those two images. (See Fig. 7).



Fig. 7. A combination of the two images in Fig. 6. The snow-free patches (dark green) on the March 2020 image are superimposed on the October 2014 image. This enhances the rim of the longhouse '*toft*' and defines its outline. Length and width of the '*toft*', measured on Google Earth was 38 m and 6.8 m.

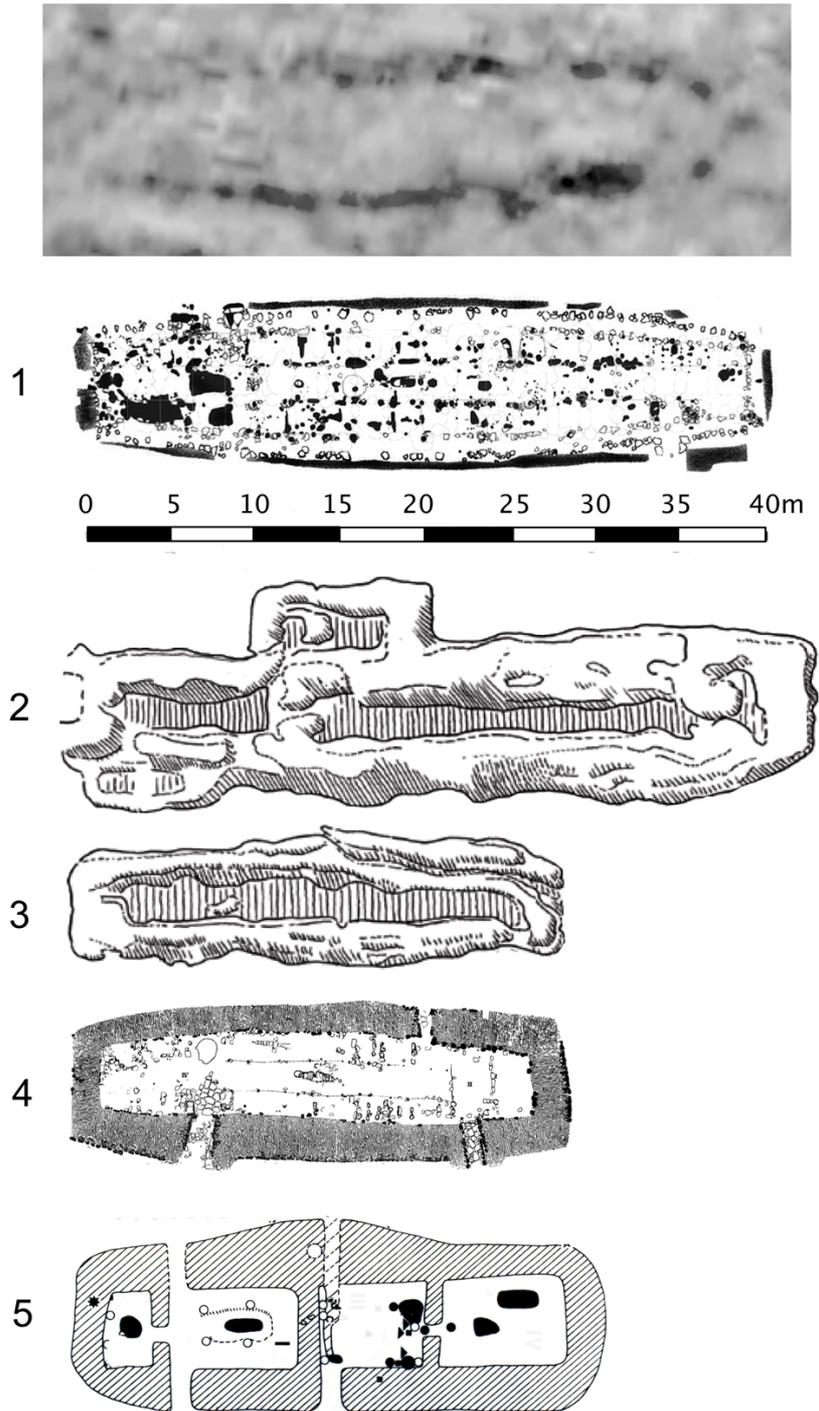


Fig 8. The longhouse structure at River Bay compared with five longhouses.

- 1: *Hofstaðir*, the largest Viking Age hall known in Iceland. Excavated (Lucas ed. 2009).
- 2: *Fremri-Fjöll*, North Iceland, not excavated (Einarsson and Aldred 2011).
- 3: *Fremri-Fjöll*, not excavated (Einarsson and Aldred 2011).
- 4: *Skallakot*, S. Iceland (Roussel 1943).
- 5: Hall A in *L'Anse aux Meadows* (Birgitta Wallace).

The River Bay longhouse figure is enhanced by combining two satellite images as shown in Fig. 7.

## APPENDIX



Fig. 1. Ha Ha Bay. Raleigh. This eroded wall (arrows) above the settlement is reminiscent of many 10-11th century turf walls in Iceland (See Fig. 2 in this report and Einarsson 2019), and is the only one seen by the author in Newfoundland so far (as of January 2021). The ground on the seaside of the wall indicates considerable activity (fishing rooms?) in the past and does not look 'Norse'. Total length of visible wall, including the eroded patch, is 550 m. A remote possibility is that the wall is created by the sea but it does not match with such coastal formations so prominent elsewhere on the Northern Peninsula.