

# Impacts of Sea-Level Rise on the Archaeological Resources of Port au Choix and L'Anse aux Meadows national historic sites and adjacent areas, northwest Newfoundland: Reducing uncertainty in risk assessment modelling through improved archaeological site information

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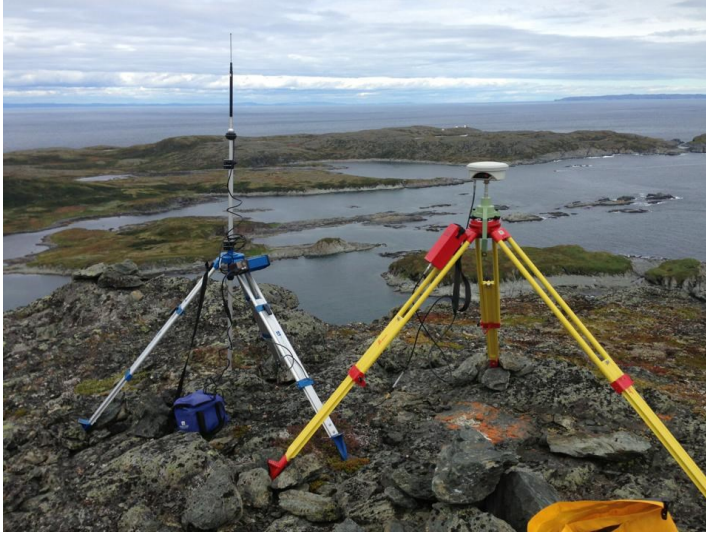
Coastal archaeological heritage is potentially vulnerable to increased erosion and flooding resulting from future sea-level rise (SLR) and storm surges. As all sites cannot be protected, it is essential that heritage managers know which sites and landscapes are most at risk so they may then prioritize resources and decision-making most effectively. Desk-based modeling of coastal vulnerability is one type of assessment tool that can provide the necessary information to inform management decisions about coastal heritage resources. A recent application of this tool in Newfoundland revealed that 20% of archaeological sites in select study regions are potentially at risk over the next 15–50 years (Westley *et al.* 2011). These preliminary results triggered the development of a new project - Coastal Archaeological Resources Risk Assessment (CARRA) – by a government-university collaboration of heritage managers and researchers, informally known as the Committee on Coastal Change and Heritage (3CH).

The overall purpose of the CARRA project is to inform management decisions that address the impacts of SLR on Newfoundland and Labrador's heritage and archaeological resources. Over the next two

years CARRA will address its research objectives through completion of the following four tasks:

1. Refine existing coastal archaeological risk assessment modeling approach;
2. Make recommendations on archaeological resource prioritization in the face of potential future loss or damage;
3. Inform specific adaptation actions with respect to at-risk archaeological resources;
4. Develop case studies on management options and responses to at-risk coastal archaeological resources in Atlantic Canada that will be transferable to other regions of Canada.

The initial archaeological risk assessment model by Westley *et al.* (2011) covered three study areas: Port au Choix, L'Anse aux Meadows and Bonavista Bay. These three areas, plus Terra Nova National Park and the Strait of Belle Isle, will be re-assessed using higher resolution datasets to establish the sensitivity of the approach for coastal and archaeological vulnerability mapping. One data refinement involves the application of newly acquired LiDAR topographic data to the development of a digital elevation model (DEM). Others involve SLR, and coastal erosion projections and



**Figure 1. Photograph of DGPS base station (Leica GS09 GNSS) with radio antenna. Photo: CARRA project.**

archaeological site georeferencing.

Fieldwork in September 2013 focused on re-survey of archaeological sites and description of their coastal setting in two of our study areas: Port au Choix (PAC) and L'Anse aux Meadows (LAM) national historic sites and adjacent areas. We were specifically interested in confirming the actual location of the site and accurately surveying any known site characteristics (e.g. site boundaries, feature densities), especially for large sites, using a Differential Global Positioning System (Figures 1 and 2). These new data will contribute to a more accurate classification of site vulnerability. Our initial step was to consult the Provincial Archeology Office (PAO) site record forms for the 73 sites identified by Westley *et al.* (2011) in the PAC (45) and LAM (28) study areas, plus any additional sites that lay within the revised study boundaries. Information from the PAO site record forms, in conjunction with any reports produced for the sites, provided guidance on boundaries, archaeological character (*e.g.*, buried or surface features) and mapped features, soil conditions and last known preservation state. Site curators and managers were contacted prior to site visits and, where practicable, consulted regarding archaeological details. Most sites were successfully relocated and mapped.

In addition to mapping the archaeological boundaries, the coastal context of each site was recorded. Observations using bespoke recording forms and photographic survey were made on the proximity of archaeological resources to the active shoreline, the character of the coast (*e.g.* geology and topography),

and evidence of active erosion. The 2014 field season will continue this field activity for sites in Bonavista Bay and the Strait of Belle Isle.

Project tasks 2-4 have also been initiated. Tasks 2 and 3 involve literature reviews of common practices in prioritization of at-risk archaeological sites and the strategies employed to protect or mitigate damage of archaeological sites under threat, respectively. For task 4, we plan to assemble a number of case studies in Atlantic Canada on the management of at-risk archaeological sites. These studies will be presented at a special session hosted by the CARRA project at the Coastal Zone Canada 2014 conference in Halifax. Based on formal and informal meetings with archaeologists and heritage managers across the country, there appears to be substantial interest in the vulnerability assessment of coastal archaeological resources and the creation of a Community of Practice to share information and expertise. CARRA will continue to take a leading role in this initiative.

Primary funding for this project is through the Competitiveness in a Changing Climate program of Natural Resources Canada and the Department of Environment and Conservation, Government of Newfoundland and Labrador. To follow progress of the CARRA project you can visit our web site at [www.carra-nl.com](http://www.carra-nl.com).

**Figure 2 Photograph of rover antenna (Leica GS09 GNSS) with hand held unit (CS09 Controller). Photo: CARRA Project.**

