

The Carpow Logboat, Perth and Kinross

Method Statement for low tide survey, environmental
sampling, excavation and lifting.



Perth and Kinross Heritage Trust,
The Lodge,
4 York Place,
Perth, PH2 8EP.
Tel: 01738 477081.
DLStrachan@pkc.gov.uk



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1 Background

The discovery of a logboat at Carpow bank on the Tay estuary was first reported by metal-detectorists in August 2001. Initial visits by archaeologists from Historic Scotland (HS); the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS); and Perth Museum and Art Gallery (PMAG) confirmed the find was a logboat, and a subsequent radiocarbon dating has produced a date of around 1,000 BC. The vessel is situated in the inter-tidal zone on the south bank of the Tay estuary, near Abernethy. Access to the site is very limited, being dependant both on a low spring tide combined with a dry period of around two weeks (ensuring that the considerable volume of water in the River Tay is low). Subsequent evaluation, part-funded by Historic Scotland, has shown the vessel to be around 9.25m in length and around 0.9m wide. Further to evaluation the vessel was sand-bagged for protection and monitored periodically (Strachan 2004).

The proposed project will involve environmental study on the inter-tidal context of the find, excavation and the lifting of the vessel, followed by conservation by the National Museum of Scotland (NMS). This document deals with the stages of work up to delivery to the NMS.

This purpose of this document is to outline the methodology to be employed for low tide survey, environmental sampling, low-tide excavation, lifting and transportation of the vessel.

2 Location

The boat (NMRS Ref NO21NW 161) is located on inter-tidal mudflats at NO 2001 1859, on Carpow bank on the south side of the estuary where the River Earn and the River Tay meet to form the head of the estuary proper (Fig. 1). The site, which is in the parish of Abernethy, has a number of environmental designations, including Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and RAMSAR Site.

The tidal amplitude of the Carpow Bank is seriously affected by the volume of water flowing downstream as result of rainfall/snow-melt. Experience has shown that only a combination of a low spring tide (with a predicted height less than 1 m OD at Dundee) will expose the vessel. A tidal window of around 3-4 hours can occur on a predicted low tide following a period of dry weather of around 1-2 weeks.

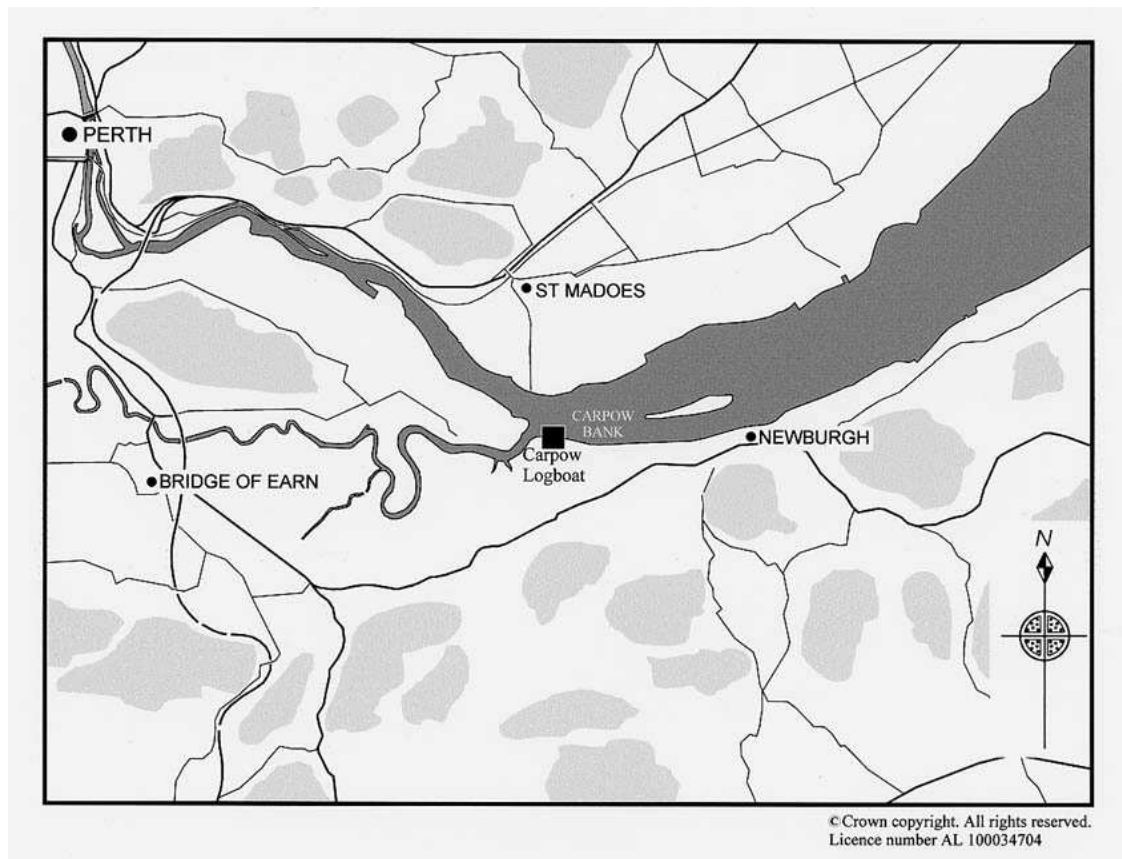


Fig. 1: Location of the Carpow bank on the Tay estuary.

3 Results of Work to Date

3.1 Initial Assessment

During an initial inspection, it was clear that the vessel was aligned almost east to west with the assumed bow of the craft pointing upstream, and around 5m of the vessel was exposed.

The timber was found to be oak of reasonably high quality with only one knot being apparent at the exposed end. The exposed section of the vessel was found to be highly abraded with some signs of rot being evident, particularly on the tops of the sides. Splitting has occurred around the exposed end and the tops of the sides have fallen away in places to leave the sheers irregular. No associated structures or artefacts were identified and the presence of thickness-gauge holes could not be demonstrated. Given the partial exposure of the vessel, the form of the vessel could not be determined.

The stern of the vessel remained buried in sands, gravels and estuarine mud however, and so the aim of subsequent evaluation work was to i) establish the date of the vessel; ii) establish the full length of the vessel; and iii) establish the condition of the buried section of the vessel (see 3.2 -3.4 below).

3.2 Radiocarbon dating

A sample (Fig. 2) was taken from the bow of the vessel for radiocarbon dating and produced a radiocarbon age of 2885 ± 50 (AA-45634/GU9597). This produces a calibrated date of between 1220 to 910 BC (93% probability). This date, from the later part of the Bronze Age, makes the vessel only one of three in Scotland dating from the second/first millennium BC (Mowat *pers comm*), as the vast majority of logboats in the country are post-Roman to medieval in date.

3.3 Evaluation of length

An evaluation was carried out in October 2002 (SUAT 2002, Strachan and Glendinning 2002) and July 2003 (Strachan 2004) primarily aimed at identifying the total length of the vessel. The 2003 work involved the use of water pumps, allowing a trench to locate the stern of the vessel (Fig. 2 and photo 3). This proved the vessel to be c. 9.25 m long, with the top of the stern being buried around 0.75m beneath the estuarine sands/gravels.

Study of the plans and sections recovered from the evaluations (Fig 2), show that either there may be a break in the vessel, or that some distortion and warping of the vessel has taken place *in situ* over time. No finds or associated archaeological deposits were recovered from the site, the vessel being buried in a pocket of sands and gravels within the inter-tidal peat shelf.

3.4 Condition of the buried section

The 2003 work also revealed the buried portion of the vessel to be in excellent condition, having suffered little erosion from either tidal action or regular exposure to the air. Of particular interest is the fact that the vessel retains an *in situ* transom board, and it is suggested that this fairly rare occurrence could produce much new information regarding log boat construction in prehistory. For example, the transom-board itself is presumed to be a tangentially-cut plank, however, this could not be confirmed as the grain of the timber is obscured by a mineral deposit coating the buried part of the vessel. The transom-board was found to be c.6cm thick and tapered to a point where contact was made with the transom-groove (see stern board detail on Fig. 2).

3.5 Initial Environmental Assessment

The vessel is located amongst inter-tidal mud, sands and gravels on an eroding peat shelf. The peat would have originally formed a continual bed across the flats, however these are eroded into a series of isolated blocks of variable thickness. In some cases the peat exposures have been undercut by erosion leaving fossil stumps exposed. The peat deposits are likely to date from around 7,500 and 8,500 BP, based on dates obtained at Invernethy and Gordon (Cullingford *et al* 1980), both of which are within 1 km of the site. These dates provide a relative sea level index of c.3m OD, more or less

equivalent to the current level of the site. The deposits in the immediate vicinity of the boat contain *in situ* peat and more recent estuarine alluvium.

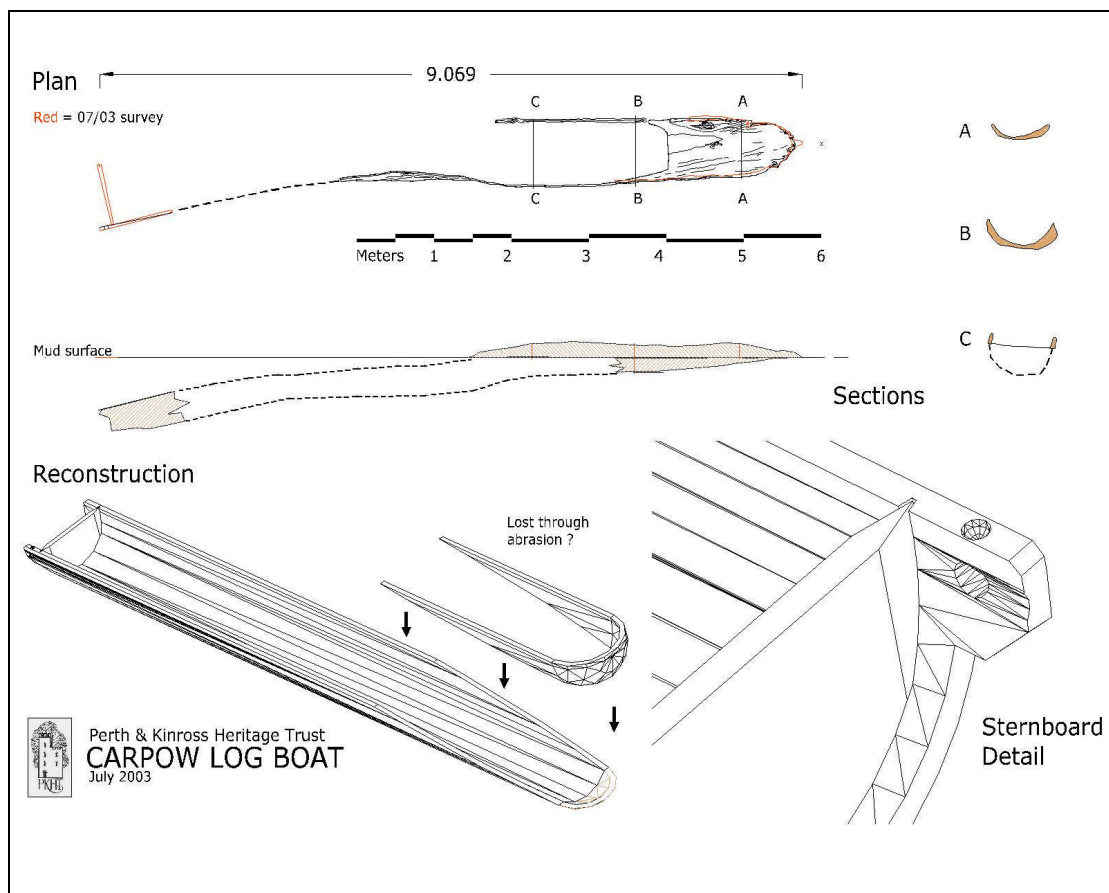


Fig 2: Plans and sections of the vessel.

4 Methodology for Proposed Work

4.1 Pre-excavation recording

At an appropriate low tide, an area approximately 15m x 8m metres around the vessel will be cleaned back by hand to allow a plan and photographic record to be made of the estuarine deposits in which the boat is buried. A temporary bench-mark will be positioned nearby the log boat using a Leica GS 50 GPS. This work is to be undertaken over one low tide window (allowing approximately a 3 hour working window).

4.2 Dating of peat deposits

At the same time as 4.1, a sample of the basal layer of the inter-tidal peat will be collected for C-14 dating, and sufficient samples taken for palaeoenvironmental analysis (pollen/plant macrofossil remains). A test-pit will

be excavated through one of the *in situ* peat formations and a column sample taken. Sample locations will be recorded in section drawings and in plan.

4.3 C-14 dating of sub-merged forest

At the same time as 4.1 paired samples for C-14 dating are to be taken from three of the ancient tree stumps surviving on the peat shelf. The location of these trees, and any others located, are to be recorded using GPS. Species identification will also be carried out on the samples. A photographic record will be made of each tree-stump and consideration will be given to suitability for dendrochronological analysis.

4.4 Low-tide pre-lift excavation

Following 4.1-4.3, at an appropriate low tide, hand excavation to a depth of around 1.0m (or to flooding) of an area approximately 1.5m around the vessel will be carried out, along with excavation of the interior of the vessel. Shoring of the excavation, using appropriate shuttering stabilised upright with iron pins, will be employed to prevent the trench filling with estuarine sands/gravels. A water-pump will be employed to allow water removal during excavation. [This technique was successfully employed in the evaluation excavations, using wooden planking and sand-bags as shoring, and water-pumps for water-removal.] If necessary, a low pressure/high volume water pump will be employed to remove any remaining sand/gravel deposits. After excavation, the interior of the vessel will be filled with hessian sand-bags.

The purpose of the excavation will be:

1. to loosen deposits around the vessel prior to lifting (4.5).
2. to allow any associated deposits/finds within the vessel to be recovered/recorded archaeologically in the best conditions available.
3. to allow easy emptying of the vessel once the vessel has been secured to the lifting frame (see 4.5).

4.5 Lifting of vessel

Following 4.4, once the vessel has been excavated and stabilised with sand-bags, a submersible metal lifting frame (10m x 1.5m in plan) will be positioned over the vessel at low tide, supported on upright legs. Again at low tide, the sandbags will be removed and the vessel secured to the lifting frame using load-bearing strops positioned underneath the vessel at closely spaced intervals. This will allow equal support along the structure of the vessel and minimise stress-loading during transportation and lifting. During the rising tide the vessel will be lifted while enclosed within the lifting frame, providing a stable flotation device which will minimise stress to the vessel while the lifting frame and vessel is transported to Newburgh harbour. This work will be

carried out by a dive team monitored by the diving archaeologist. The lifting frame and vessel will then be lifted, still enclosed within the lifting frame onto a flat-bed lorry for transportation to National Museum of Scotland accommodation at Granton, Edinburgh (where the vessel will undergo conservation treatment). The vessel will be lifted enclosed within the lifting frame using an appropriate crane, with suspension time being kept to a minimum.

Should, for any reason, there be a delay in lifting the vessel onto land, the submersible lifting frame will allow the vessel to remain underwater for temporary storage, and also allow access to monitor its condition.

A working boat, moored on site, will provide a stable working platform for all operations, and also provide transportation for the submersible lifting frame, in addition to an off-site rest area for the team.

4.5 Site restoration

All lifting materials and aids will be removed from the site, and the excavation site will be back-filled and consolidated using hessian sand-bags in agreement with Scottish Natural Heritage.

5 Project Timing

At present the project is planned for two tidal windows:

Window	Date	Predicted tide Metres OD (Dundee)
1	26/07/06	1.00
1	27/07/06	0.92
1	28/07/06	0.90
1	29/07/06	0.96
2	09/08/06	0.69
2	10/08/06	0.36
2	11/08/06	0.18
2	12/08/06	0.17
2	13/08/06	0.33
2	14/08/06	0.64

The latter window includes some of the lowest predicted tides of the year, maximising the working low tide window.

6 Project Team

A bespoke team has been selected for the project based on a breadth of knowledge based on both archaeological and marine engineering backgrounds.

David Strachan MIFA (PKHT)

Project Manager

Graduated from Cardiff University prior to working for Cadw: Welsh Historic Monuments, the Royal Commission on the Ancient and Historical Monuments of Scotland, and the Heritage Conservation Group of Essex County Council. Appointed as Archaeologist with Perth and Kinross Heritage Trust in 2000, he is now Manager/Archaeologist of the Trust. Relevant work includes a three year period of involvement with inter-tidal archaeology in Essex, largely in the Blackwater estuary area and relating to Saxon fish-weirs and Iron Age/Roman salt production sites.

Steve Liscoe (Consultant)

Diving Archaeologist

Began a career as a professional diver in the late 1970s and has some twenty years involvement with underwater archaeological sites and projects, including three years working on the Mary Rose excavation as a staff diver. Attained a HSE Pt IV diving ticket (1981) then qualified as H.S.E. Pt III before training as a Diver Medical Technician and Air Diving Supervisor. Recently qualified as an ADC Inshore Diving Supervisor. Until 2003 worked full time for the Archaeological Diving Unit providing expertise in logistical support in the field.

Jim Ferguson (Moorings and Marine Services)

Involved in various commercial diving operations throughout Scotland since 1994. Based in Abernethy, recent salvage work has included the lifting of a light aircraft (N7000) from the inter-tidal zone near Errol on the Tay estuary in 2003. HSE Pt I diving ticket.

Bruce Glendinning MIFA (CFA Archaeology Ltd)

Archaeologist

Graduated from the University of Glasgow in 1993 with a BSc in Archaeology and subsequently worked as a professional archaeologist with many units throughout Scotland and England. He has extensive experience of managing large-scale archaeological projects in both rural and urban environments, and was involved in the evaluation excavations on the Carpow logboat in 2003.

Dr Michael Cressey MIFA (CFA Archaeology Ltd)

Palaeoenvironmental Scientist

Dr Cressey has been working as a field archaeologist since 1982, and completed the MSc in Environmental Archaeology and Palaeoeconomy at Sheffield University in 1991. During the course of his postgraduate studies he considerably developed his soil science skills, and he is also skilled in palynology and fossil wood identification. His most recent research has involved the analyses of shoreline sediments in the Solway Firth.

Sarah Winlow AIFA (PKHT)

Archaeologist

Background in field archaeology and curatorial use of GIS, experience of inter-tidal work gained during evaluation excavations on the Carpow logboat in 2003.

Lindsay Farquharson (PKHT)
Archaeologist

A recent graduate of Glasgow University, currently working on curatorial use of GIS.

*Additional appropriately qualified diving staff (up to four in total) are to be made available by **Moorings and Marine Services as required.**

6 References

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Appendix 1: Photographs



PHOTO 1: The stern of the vessel as revealed during the evaluation excavation.



PHOTO 2 (LEFT): Flooding of evaluation trenches following removal of estuarine deposits. **PHOTO 3 (RIGHT):** Sand-bagging of the vessel following excavation. The site is now being monitored and was last visited 14/05/06, when it was found that the site had stabilised well.