

Archaeology C14 Radiocarbon Dates Scheme

Recipient name:	Michael Lynch
Discipline and subject area:	Archaeology C14 Radiocarbon Dates Scheme
Year awarded:	2023
Title of project:	Excavation of the Prehistoric Axe Manufacturing Site at the storm beach at Ballaghaline, near Fisherstreet, Doolin in Co. Clare.

Summary of findings:

The excavation in Ballaghaline Townland in Co. Clare on a south/south-west facing stormbeach between Doolin Pier and the mouth of the Aille River at Tráleathan has been ongoing since 2015. The site is located at high tide level along a stretch of limestone coastline consisting of storm beach stones/boulders and sand dunes with a natural clay layer beneath.

The winter storm of 2013/2014 had a dramatic effect on this coastline. Between ten and twenty metres of the sand dunes were completely washed away and, whilst much of the underlying clay layer had also been removed, large patches were still visible along the stormbeach at high tide level. It was clear from inspection that the exposed clay layer was rapidly eroding. Assessment showed large quantities of shale flakes and some axe roughouts and hammerstones eroding from certain areas of the clay. This is a volatile storm beach even during normal weather conditions with the stones and boulders being constantly moved about. A monitoring and survey programme for approximately 250m of the storm beach was initiated and areas within the clay were identified with a high density of shale lithics along with occasional small pieces of charcoal and bone.



A licence (I5E0145) was granted to excavate the clay layer and excavation has continued since 2015 and will extend into 2024.

The shale material recovered is similar to that found by Matilda Knowlesi and the Limerick Field Club in 1899. This material, which is now housed in the National Museum of Ireland and the Limerick Museum, led to the designation of the Doolin 'Stone Axe Factory' and the site has subsequently been regarded in the Irish Archaeological literature as an important source of Neolithic and Bronze Age shale axes. The current excavation has shown that the



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manufacture of shale axe roughouts definitely took place here along with the production of other shale tools and RC dates have shown that this activity took place during the Mesolithic period. A single RC date provided by the RIA in 2016 (see report 1/12/2016) gave a Later Mesolithic date for Context 7 in Trench 1.

Two further RC dates provided by the RIA in 2017 (see report 28/11/2017) gave a Later Mesolithic date for Context 6 in Trench 1 and an Early Mesolithic date for Context 13 in Trench 4. The RIA provided three further RC dates in 2020 (see report 25/11/2020). Two of these gave Later Mesolithic dates for Context 24 in Trench 5E & Context 26 in Trench 5C, whilst the third from Context 25 in Trench 5CE gave a date close to the transition from the Early to the Later Mesolithic. In 2022 three further RC dates were provided by the RIA (see report 14/10/22). All three gave Later Mesolithic dates; two from Context 27 in Trench 6W and one from Context 28 in Trench 6E. Additional dates provided by the writer have confirmed the Mesolithic activity across the site.

In 2023 the RIA provided three further RC dates with the following results:

Sample 1: Charcoal: 15E0145:21:688; Hazel.

The RC date and calibration are as follows:

UBA-51618: Radiocarbon Age 5916 +/- 35.

Calibrated: 68.3 (1 Sigma) Cal BC 4834 – 4813 (0.243)

Cal BC 4802 – 4772 (0.339)

Cal BC 4763 – 4725 (0.418)

95.4 (2 Sigma) Cal BC 4894 – 4868 (0.049)

Cal BC 4849 – 4712 (0.951)

This sample was found in Context 21 (Trench 4A1) which included 10 hammerstones, a similar number of shale axe roughouts and numerous flakes and blades. The charcoal sample was found in C21 with Find No. 21:40, a hammerstone with struck shale flakes. The date, with a median probability of 4786 Cal BC securely dates this knapping event. The date fits comfortably within the chronology being developed across the site and is the eleventh with a median probability which falls within 4500 - 5000 Cal BC.

Sample 2: Charcoal: 15E0145:21:692; Pine.

The RC date and calibration are as follows:

UBA-51619: Radiocarbon Age 6128 +/- 33.

Calibrated: 68.3 (1 Sigma) Cal BC 5206 – 5172 (0.293)

68.3 (1 Sigma) Cal BC 5111 – 5105 (0.030)

68.3 (1 Sigma) Cal BC 5072 – 4996 (0.677)

95.4 (2 Sigma) Cal BC 5209 – 4986 (0.973)

95.4 (2 Sigma) Cal BC 4970 – 4954 (0.027)



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This sample was found in Context 21 (Trench 4A1) and is the second sample to be dated (see Sample 1) from this archaeologically rich context which included 10 hammerstones, a similar number of shale axe roughouts and numerous flakes and blades. The charcoal sample was found in C21, deep within a gryke, with Find No.21:70, a group of struck shale flakes. Area 4, with nine sub trenches, is one of the most extensive excavated areas on the site with previous samples from the central and eastern sections of Area 4 dating to both the Early and Later Mesolithic periods. Trench 4A1 was at the western end of Area 4 and, since the sample was located with flakes at a much lower level than most other artefacts in C21, it was anticipated that the sample might have an early date. However, the date has a median probability of 5062 Cal BC, less than three centuries earlier than Sample 1. Some of this difference may be due to the 'old wood effect' of the pine.

Sample 3: Charcoal: 15E0145:11:411; Prunus.

The RC date and calibration are as follows:

UBA-51620: Radiocarbon Age 5568 +/- 33.

Calibrated: 68.3 (1 Sigma) Cal BC 4444 – 4419 (0.374)

68.3 (1 Sigma) Cal BC 4401 - 4359 (0.626)

95.4 (2 Sigma) Cal BC 4455 - 4345 (1.000)

Sample 3 was found in Context 11 (Trench 3A) which included a large number of shale flakes and other shale pieces including cobbles and pebbles. Out of approximately 200 artefacts, only one broken hammerstone, one possible hammerstone and several axe roughouts were found, much less than in Trenches 3B and 3C, indicating a possible area of scattered discarded material. The charcoal sample was found in C11 with Find No. 11:115, a shale flake, and has a median probability of 4402 Cal BC, which is slightly later than many dates from the site but well within the Later Mesolithic period. This RC date, the first obtained from Context 11, provides a date for the deposition of material that differs from most other contexts on the site and is an important addition to the overall chronology of the site.

Summary.

All three dates show activity in the Later Mesolithic period. Sample 1 from Context 21 provides a date for a knapping episode within an area of intense knapping activity. Sample 2 from the same context but much lower in the clay layer is somewhat earlier, hence confirming the stratigraphy as excavated, but it does not corroborate the Early Mesolithic dates previously obtained from other trenches in Area 4. Fifty percent of the dates obtained from the site have median probabilities between 4500 – 5000 Cal BC. Sample 3 is a century later. This adds to an emerging trend indicating that the eastern end of the survey area has earlier activity than that of the western end.

These additional dates make a valuable contribution to the developing chronology of the site.

Please outline the objectives of the project.

The objectives of the project are:

- To recover the eroding archaeological material from the site before it is lost to storms, weather, etc.
- To date the activity on the site, mainly the manufacture of axe roughouts and other shale tools.

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- To provide a dated context for the Knowles collection of material in the NMI and Limerick Museum from this site.
- To provide information on the techniques used in the manufacture of shale axes and other tools over time in prehistory, particularly in the Mesolithic period.
- To disseminate the results of the project to the local community and wider audience.

Please describe the methodology used in conducting the research.

Continual monitoring and collection of surface finds under licence from the designated survey area on the storm beach. Identify areas where archaeological material is being eroded from the clay layer.

Excavation under licence of the vulnerable archaeological material.

RC dating of the archaeological contexts.

Post-ex analysis of the lithics, organic material and soil samples.

Report and publication of results.

Disseminate the project results to the

local community through the Field Monument Advisor (FMA) project and the participation of local volunteers (Burrenbeo Trust Volunteers) in the excavation and post-ex work.



Please outline the findings of your research and/or milestones achieved.

Areas of definite shale axe and other tool manufacture have been established.

RC dates have confirmed that this activity took place in the Mesolithic period whereas it was previously assumed to be Neolithic or Bronze Age.

A dated context for the Knowles material in the NMI and Limerick Museum has been established.

Established that Ballaghaline, Doolin is a viable source for the shale axes and roughouts found at Fanore More sites 1 and 2 (the first known Mesolithic sites in Co. Clare) and further afield.

RC dates indicate that the activity on the site extends from the Early Mesolithic to the end of the Later Mesolithic period.

Please provide details of the dissemination of the outcomes from this project.

The excavation of the site is of great local interest but it is also important nationally.

Local volunteers from the Burrenbeo Trust took part in the monitoring, excavation and post-ex work.

This heightens the profile of the project among the north Clare communities.

The project can be considered to fall into the category of 'community archaeological projects'.

The dating of the site will be an essential part of the final report and publication.

Information on the site has already been disseminated to the local and wider communities through presentations under the Field Monument Advisor (FMA) programme.



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Articles have already been published in publications such as Archaeology Ireland.

A presentation, given during heritage week on Fanore and Doolin, in collaboration with Burrenbeo Trust is currently available on their website platform.

An overview of the RC dates will be shared on the FMA Facebook page.

A presentation on the dates from the site was given at the 'Revealing the Past' conference in Dec. 2023.

No. of Academic Papers/articles published: 2

No. of Lectures given/outreach events: 3

How will you continue to communicate the results of your project and what are your publication plans?

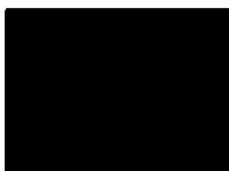
As this is an ongoing project, information on the results will continue to be disseminated through presentations, publications, the Burrenbeo website and the FMA Facebook page. When the final report is concluded the results will be published and an academic paper will be submitted to an appropriate publication.

How did the award enhance your professional development?

The RIA's provision of RC dates, which is an important objective of the project, adds greatly to the results and interpretation of the site and therefore will enhance the stature of the final report among the wider archaeological community. It has already initiated communication and collaborations with other researchers in the Mesolithic period.

What plans (if any) do you have to further your proposal/project?

The project is ongoing and while erosion of the archaeological material continues more information will be collected and interpreted, with analysis of the lithics and further RC dates being essential elements of the project.

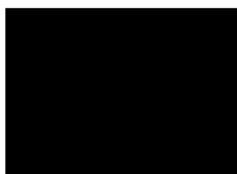


¹⁴CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification: UBA-51618
Date of Measurement: 2023-09-28
Site: Ballaghaline, Co.Clare
Sample ID: 15E0145:21:688
Material Dated: charcoal
Pretreatment: AAA
mg Graphite: 0.917
Submitted by: Michael Lynch

Conventional ¹⁴ C	
Age:	5916±35 BP
Fraction	using AMS
corrected	δ ¹³ C

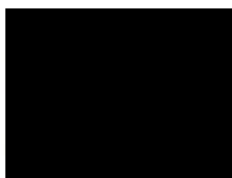


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Radiocarbon Date Certificate

Laboratory Identification: UBA-51619
Date of Measurement: 2023-09-28
Site: Ballaghaline, Co. Clare
Sample ID: 15E0145:21:692
Material Dated: charcoal
Pretreatment: AAA
mg Graphite: 0.998
Submitted by: Michael Lynch

Conventional ¹⁴ C	
Age:	6128±33 BP
Fraction	using AMS
corrected	δ ¹³ C



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Radiocarbon Date Certificate

Laboratory Identification: UBA-51620
Date of Measurement: 2023-09-28
Site: Ballaghaline, Co.Clare
Sample ID: 15E0145:11:411
Material Dated: charcoal
Pretreatment: AAA
mg Graphite: 0.969
Submitted by: Michael Lynch

Conventional ¹⁴ C	
Age:	5568±33 BP
Fraction	using AMS
corrected	δ ¹³ C