Acadamh Ríoga na hÉireann
Royal Irish Academy

Archaeology C14 Radiocarbon Dates Scheme

Recipient name:	Rory Conolly
Discipline and subject area:	Archaeology C14 Radiocarbon Dates Scheme
Year awarded:	2023
Title of project:	Dating the shell midden (SL013-117) at Culleenamore, Co. Sligo

Summary of findings:

Under the RIA Archaeology C14 Radiocarbon Dates Scheme four radiocarbon dates were obtained from a shell midden at Culleenamore, Co. Sligo (SL013-117). This sampling was carried out in parallel with a wider research project led by the author investigating a series of shell middens around Ballysadare Bay and Sligo Bay, funded by an Irish Research Council Government of Ireland Postdoctoral Fellowship (GOIPD/2021/228). Licence holder for the on-site works carried out was Alan Healy of Archaeological Management Solutions (AMS).

SL013-117 is situated on the southeast end of a low point on the shore of Ballysadare Bay, 0.2 km WSW of another shell midden SL013-091. Midden material is exposed and eroding in various places within a low grass-covered mound (diam. c. 8-9m; H 1.6-1.6m). Oyster (Ostrea sp.) shells predominate but limpet (Patella sp.) shells are also present in small quantities.

The results of this study confirm that the deposition of midden material at this site largely dates to the Middle Neolithic, with a later phase of medieval activity also identified.

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

Radiocarbon dates obtained from four oyster shell samples are outlined below with marine reservoir correction applied. We have now confirmed that the deposition of midden material at this site largely dates to the Middle Neolithic, with a later phase of medieval activity also identified.

Sample 1: UBA-51843
Radiocarbon Age 4886±30
Delta R = -206±53
Calibration data set: marine20.14c
#Heaton et al. 2020
One Sigma Ranges: [start:end] relative area
[cal BC 3400: cal BC 3165]
Two Sigma Ranges: [start:end] relative area
[cal BC 3505: cal BC 3062]

Sample 2: UBA-51844
Radiocarbon Age 5072±30
Delta R = -206±53
Calibration data set: marine20.14c
#Heaton et al. 2020

One Sigma Ranges: [start:end] relative area
[cal BC 3597: cal BC 3406]
Two Sigma Ranges: [start:end] relative area
[cal BC 3677: cal BC 3322]

Sample 3: UBA-51845
Radiocarbon Age 4994±28
Delta R = -206±53
Calibration data set: marine20.14c
#Heaton et al. 2020
One Sigma Ranges: [start:end] relative area
[cal BC 3516: cal BC 3333]
Two Sigma Ranges: [start:end] relative area
[cal BC 3621: cal BC 3227]

Sample 4: UBA-51846
Radiocarbon Age 1378±22
Delta R = -206±53
Calibration data set: marine20.14c
#Heaton et al. 2020
One Sigma Ranges: [start:end] relative area
[cal AD 884: cal AD 1060]
Two Sigma Ranges: [start:end] relative area
[cal AD 794: cal AD 1157]

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CALIB RADIOCARBON CALIBRATION PROGRAM*

*Used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.
Heaton TJ, Köhler P, Butzin M, Bard E, Reimer RW, Austin WEN, Bronk Ramsey C, Grootes PM, # Hughen KA, Kromer B, Reimer PJ, Adkins J, Burke A, Cook MS, Olsen J, Skinner LC.
2020.

Marine20-the marine radiocarbon age calibration curve (0-55,000 cal BP).
Radiocarbon 62. doi: 10.1017/RDC.2020.68.

Please outline the objectives of the project.

SL013-117 was sampled with the following project objectives in mind:

• To recover archaeological material suitable for radiocarbon dating from the site before it is lost to erosion.
• To establish the timing and duration of midden formation and better situate the site chronologically in relation to monuments in the surrounding landscape.
• To disseminate the results to local stakeholders and the wider archaeological community.

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Please describe the methodology used in conducting the research.

Methodology:

• Ongoing monitoring has been undertaken at the site to identify areas vulnerable to erosion and the loss of archaeological material;
• Export and alter licence applications were submitted to NMI;
• Collection of samples for radiocarbon dating;
• All necessary on-site site illustration, photography, survey and recording;
• Initial processing and appropriate bagging of all extracted environmental samples;
• Preparation of a Post-excavation Assessment Report;

Recording methods:

A comprehensive recording process was followed. A full and detailed record of sampling was maintained throughout. Each archaeological section was drawn to scale or recorded by photogrammetry and Ordnance Datum (OD) levels taken.

Photographic recording:

Photographs were also taken to record the archaeology in its landscape setting. A digital camera with a pixel count of eighteen million pixels was used to take high-quality photographs suitable for use in reports, displays or publication. Care was taken to ensure that the portion of the sampled area visible within the photograph was clean and clear of spoil, tools and equipment, litter, tarpaulins, etc. Photographs included a north point and appropriate scale.

Surveying:

All site surveying was undertaken using a Lecia Viva GS14 and georeferenced to the ITM and OD. All site planning and recording grid systems were plotted and OD levels obtained for all features and across the topography of the site. As a matter of course, survey data were quality checked on a regular basis and downloaded to a secure format as a quality control procedure.

Sampling methods:

Retrieval and analysis of environmental samples was in accordance with the following:

• TII Palaeo-environmental Sampling Guidelines (McClatchie et al. 2015)
• Environmental Sampling: Guidelines for Archaeologists (IAI 2007)

This involved the retrieval of shells from contexts with minimal signs of disturbance. The locations from which the samples were taken was noted and the location and depth - as well as the context/strata - were recorded using differential GPS.

Constraints on methods:

One constraint being the recording of the midden using conventional tape and line survey from certain

surveyed section points, due to the possible unnecessary damage that would have entailed. Where appropriate, survey targets were instead picked up and photogrammetry was used to create scaled ortho sections of the midden.

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

In addition to the forthcoming paper, the results of this study will be disseminated through oral presentations at academic conferences and through public talks aimed at local stakeholders.

Abstracts for oral presentations, which will include the radiocarbon dates obtained here, have been submitted to the following conferences for 2024:

Institute of Archaeologists of Ireland (IAI) Conference 2024
Theme: Common Trends: Recent excavations, finds and research
12-13 April 2024
Absolute Hotel, Limerick City

Oceans Past Conference 2024 (OPI)
Theme: Historical perspectives on human-ocean interactions: deep understandings for informing ocean futures
25-28 June 2024
Penryn Campus, Cornwall, University of Exeter, United Kingdom

The Fourth World Congress of Environmental History (WCEH24)
Theme: Transitions, Transformations and Transdisciplinarity: Histories beyond History
09-23 August 2024
University of Oulu, Finland

35th International Geographical Congress 2024 (IGC2024)
Theme: Celebrating a World of Difference
24-28 August 2024
Dublin City University (DCU), Dublin Ireland

30th European Association of Archaeologists (EAA) Annual Meeting
Theme: Persisting with change
28-31 August 2024
Sapienza University of Rome, Rome, Italy

How did the award enhance your professional development?

The new dates are important in offsetting the loss of archaeological data to ongoing erosion, as material from the site is continually washed away during storm surges. The scheme has helped facilitate and enhance collaboration with colleagues outside of academia working in the commercial archaeology sector, as well as continued collaboration with researchers specialising in Irish Neolithic studies.

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

Coastal shell middens remain a central research focus for the author. This site, along with a number of other vulnerable shell midden sites situated in the wider N.W region, are part of an ongoing monitoring and survey programme. Future plans include conducting additional analyses and implementing necessary measures or works where deemed appropriate.

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

Radiocarbon Date Certificate

Laboratory Identification:	UBA-51843
Date of Measurement:	2023-12-14
Site:	SL013-117
Sample ID:	22E0643/C2/S2
Material Dated:	shell or other carbonates
Pretreatment:	Acid Etch
mg Graphite:	0.924
Submitted by:	Rory Connolly-RIA

Conventional ^{14}C Age:	4866±30 BP
Fraction corrected	using AMS $\delta^{13}C$

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Radiocarbon Date Certificate

Laboratory Identification:	UBA-51844
Date of Measurement:	2023-12-14
Site:	
Sample ID:	22E0643/C2/S3
Material Dated:	shell or other carbonates
Pretreatment:	Acid Etch
mg Graphite:	0.931
Submitted by:	Rory Connolly-RIA

Conventional ^{14}C Age:	5072±30 BP
Fraction corrected	using AMS $\delta^{13}C$

^{14}CHRONO Centre
Queens University
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Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-51845
Date of Measurement:	2023-12-14
Site:	SL013-117
Sample ID:	22E0643/C2/S4
Material Dated:	shell or other carbonates
Pretreatment:	Acid Etch
mg Graphite:	0.917
Submitted by:	Rory Connolly-RIA

Conventional ^{14}C Age:	4994±28 BP
Fraction corrected	using AMS $\delta^{13}C$

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Radiocarbon Date Certificate

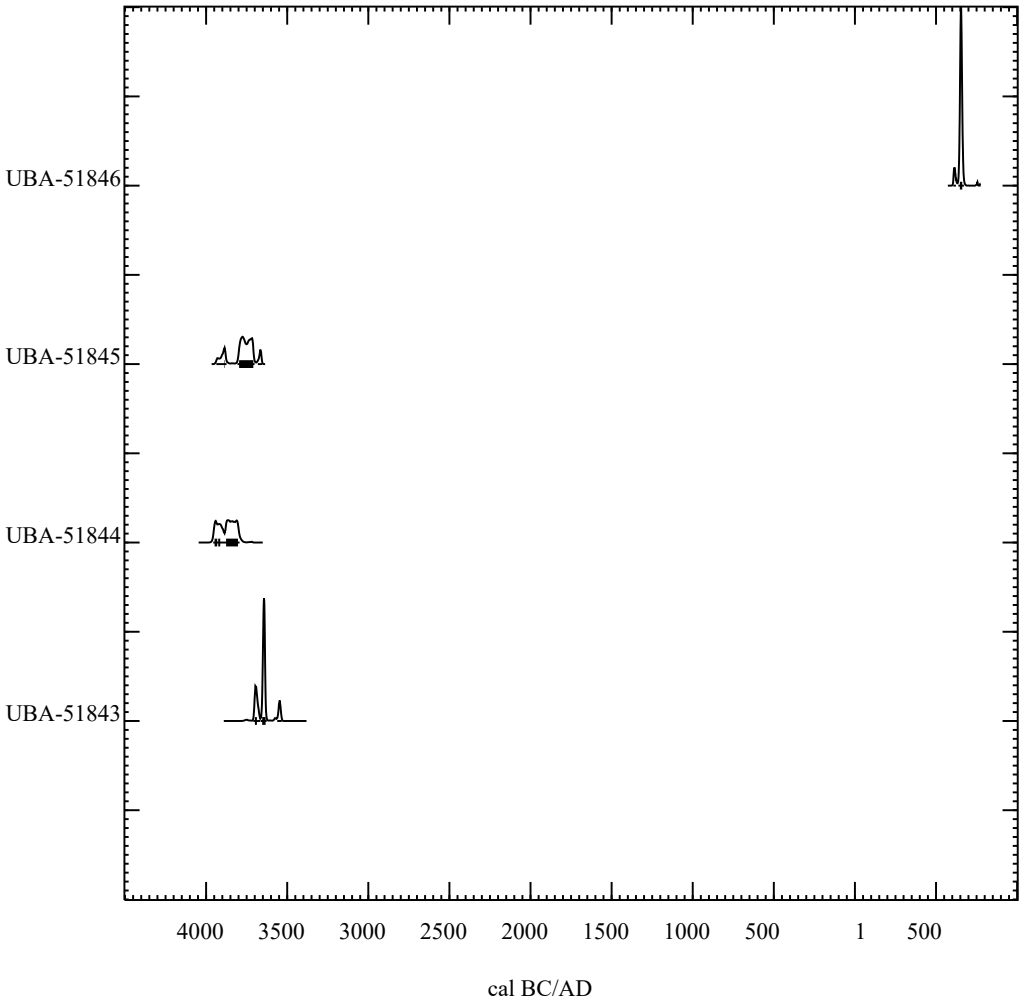
Laboratory Identification:	UBA-51846
Date of Measurement:	2023-12-14
Site:	SL013-117
Sample ID:	22E0643/C2/S6
Material Dated:	shell or other carbonates
Pretreatment:	Acid Etch
mg Graphite:	0.957
Submitted by:	Rory Connolly-RIA

Conventional ^{14}C Age:	1378±22 BP
Fraction corrected	using AMS $\delta^{13}C$

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated range impinges on end of calibration data set
0* represents a "negative" age BP
1955* or 1960* denote influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

Posterior Probability Distributions



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